VIRTUAL TUTORIAL SYSTEM FOR PRE-CALCULUS COURSE

By

MUHAMAD HUMAM BIN HAMZAH

FINAL REPORT

Submitted to the Electrical & Electronics Engineering Programme
in Partial Fulfillment of the Requirements
for the Degree
Bachelor of Engineering (Hons)
(Electrical & Electronics Engineering)

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CERTIFICATION OF APPROVAL

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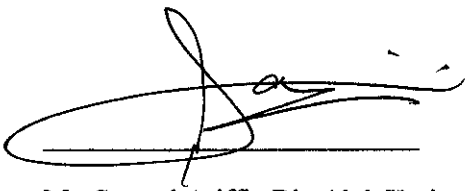
Approved:



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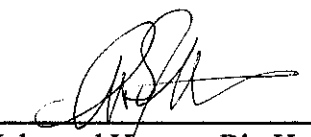
TRONOH, PERAK

May 2011

CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.



Muhamad Humam Bin Hamzah

ABSTRACT

The Web is a delivery medium, as well as a provider of content and subject matter. It is easy to use the website to deliver all of these offerings in text, graphics, sound and video. The report will discuss about the background of the study, objective and scope. Inside the report, there will be also included the literature review, methodology and finally the conclusion. The purpose of this project is focusing on creating the virtual tutorial that can be access on the website via the internet. The advantages of web-based learning (WBL) in education include overcoming barriers of distance and time, economies of scale, and novel instructional methods. The pre-calculus course will be the chosen course that will be converted into virtual tutorial. The course can be accesses through the internet by the student for the note, tutorial, assignment and quiz. The system also calculates the student performance and shows it to the lecturer. Thus, the website will become more favorable to the student and the lecturer. This will make sure the virtual tutorial created is powerful and interesting.

ACKNOWLEDGEMENTS

First and foremost, praise Allah the Almighty, who has helped and gave me encourage and strength in completing the Final Year Project (FYP). I would not be able to make it through if it was not for his blessings.

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Not to be forgotten, my greatest appreciation goes to all my lovable family members. To my beloved mother and father, Puan Habibah Bt Hj Ismail and Hamzah bin Abdullah, who have always stood by my side and always remembered me in her prayers. To my siblings, Mohd Haikal, Nur Hamimi, Rayhan and Hilwani; for their individually motivation, advice and support throughout my journey in UTP

I would like to take opportunity to express my deepest gratitude to all my friends who have shared their knowledge and gave comments throughout the completion of this project. You have shared and colored my most memorable moment in life, as it would always be in my heart forever.

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CHAPTER 1

INTRODUCTION

1.1 Background of Study

As an increasingly powerful, interactive, and dynamic medium for delivering information, the World Wide Web (Web) in combination with information technology (e.g., LAN, WAN, Internet, etc) has found many applications. One popular application has been for education use, such as Web-based, distance, distributed or online learning. The use of the Web as an educational tool has provided learners and educators with a wider range of new and interesting learning experiences and teaching environments, not possible in traditional in class education. Web-based learning environment have been developed mainly by instructional designers using traditional instructional design models such as the instructional systems design, cognitive flexibility theory, and constructivist learning environment. However, many of these approaches still lack two important considerations needed for implementing learning applications based on the Web: (1) integration of the user interface design with instructional design, and (2) development of the evaluation framework to improve the overall quality of Web-based learning environments [1].

Web-based learning (WBL) encompasses all educational interventions that make use of generally consist of information structured by the teacher in a way that will hopefully facilitate learning. Tutorials are often enhanced by features such as multimedia (sound, pictures, movies, and animations), links to online resources (full-

text journal articles or related websites) and other areas within the course, and self-assessment tools. Teachers take on the role of facilitators – defining the scope of the discussion, monitoring and guiding the discussion as needed, and providing or helping students to find additional resources [2]. The internet has found many functions in education in which the primary intent is not an educational intervention designed for web-based delivery. These include archives of face-to-face lectures (e.g. Power- Point slides or videotaped lectures) and course syllabi, online administration of tests and course evaluations, and administrative communications.

First, little attention has been paid to design issues of the human-computer interface, which are critical factors to the success of Web-based instruction. Learners must be able to easily focus on learning materials without having to make an effort to figure out how to access them. However, current instructional design principles and models do not explicitly address usability issues of the human-computer interface. Second, the rapid growth of Web-based learning applications has generated a need for methods to systematically collect continuous feedback from users to improve learning environments. Unfortunately, few attempts have been made to develop such formative evaluation frameworks for Web-based learning environments whose foci are both the instructional system and user interface system. In addition, few approaches take user interface design issues into account in their evaluation processes. A number of evaluation frameworks that can be used to evaluate the user interfaces have been proposed. But, these models are intended for software environments rather than for Web-based learning environments in which user interface systems should be developed to support users' learning activities [1].

1.2 Problem Statement

Learning in the class sometime can be very boring with its plain presentation. The normal learning environment that been practice nowadays can make the student become less efficient. Some students don't prefer in class learning environment but some of them really like in class learning environment and give their all. But both of this type of student still needs to do revision once they go out from class. If they don't revised what have been learnt during class hour, the knowledge will disperse into the wind. The condition of learning with the fixed time table and time a week make the time for learn is limited. We needed an efficient way to introduce students to the very basic techniques of finding online information through a short, self-guided tutorial.

1.3 Objective

The main objective of this project is to create a virtual tutorial for a pre-calculus course. There are, for example, a significant number of students who are not served by the in-person classes we offer, or who need something more. Teaching these student individually, in one-on-one meetings, is a very inefficient use of the lecturer time, and offering special classes at set times is convenient for only some of these students. I hope to develop the initial model into an online tutorial that could introduce these students after which they could meet with a lecturer, if needed, for follow-up questions or more specific or advanced instruction. Finally, there are many other types of training and teaching that does might lend themselves to this format, from showing the student to learn the tutorial and answer the quiz at their room or cafeteria with wi-fi.

1.4 Scope of Study

The scope of this project can be divided into 2 parts. First part is where the construction of the virtual tutorial which is required knowledge and research through various sources. The concept of web building which is html, php, mySQL, javascript and etc is applied in this first part. The second part of the study is the information or the content of the tutorial. The content of the virtual tutorial is the pre-calculus course. The study on pre-calculus need to be done because to teach other about pre-calculus, the need to understand the pre-calculus will be the first priority.

CHAPTER 2

LITERATURE REVIEW

2.1 Web-Based Learning

The proliferation of Web-based technologies during the last decade may have given the impression of wide-spread changes in educational practices. In fact, we have only begun to scratch the surface of experiencing the vast impact these technologies could have on education. Viewed separately, web-based technologies offer exciting possibilities for expanding the capacity to provide access to instruction and knowledge world-wide. However, and perhaps more importantly, viewing these technological advancements in a more dynamic context, forces educators and researchers to rethink the fundamental processes of teaching and learning. It's not just a simple matter of using a technical tool to supply time and place ubiquity but to accept the challenge of understanding the implications for the entire educational spectrum. Web-based teaching and learning begs the question of what exactly these technologies means for learners, teachers, program designers, academic experts, technical and administrative staff, institutional decision makers, training managers, publishers, and others. Although a considerable amount of exploration has been conducted regarding web-based learning technologies, the breadth and scope for dialogue and experimentation needs to be broadened [3].

Web-based learning offers the promise of individualized learning. Learners can be given greater control over the learning environment by allowing them to select from among multiple different learning opportunities within a given course and move at their own pace. Along with flexibility in physical location, WBL offers flexibility in timing of participation. In contrast to lectures given at a fixed time, learners can access a WBL tutorial or virtual patient at any time day or night. Finally, WBL facilitates assessment and documentation of educational objectives. Online assessment has the same flexibility in distance and timing as the WBL intervention, and also allows immediate customized feedback. Furthermore, in an age when documentation of learning tasks and competence is increasingly expected, WBL can serve a useful administrative purpose [2].

Many know that the main challenge face by the long distance learning is the student and lecturer, student and student is physically separated. This can bring the isolation felling to the student and can rise the problem of motivation and learning. It also one of the problem face by the student at Pusat Pengajian Pendidikan Jarak Jauh (PPPJ) and Universiti Sains Malaysia (USM) that been listed by Lucille Das [13].One of the solution is the student, the lecturer and the organization must communicate each other (Lucille Das, 2001). According to Cheah [12], the rapid development of technology helps reduce the gap of time and also the physical gap between the student and lecturer and also between the students itself [11].

2.2 University Teknologi Petronas e-Learning (Moodle)

University Teknologi Petronas (UTP) also has its own portal for the student use. It been made from a Moodle. Moodle (Modular Object-Oriented Dynamic Learning Environment) is a free and open-source e-learning software platform, also known as a Course Management System, Learning Management System, or Virtual Learning Environment (VLE). Moodle was originally developed by Martin Dougiamas to help educators create online courses with a focus on interaction and collaborative construction of content, and is in continual evolution. Moodle is an active and evolving product. Moodle's overall design [4]:

- Suitable for 100% online classes as well as supplementing face-to-face learning
- Simple, lightweight, efficient, compatible, low-tech browser interface
- Full database abstraction supports all major brands of database (except for initial table definition)
- Course listing shows descriptions for every course on the server, including accessibility to guests.
- Courses can be categorised and searched - one Moodle site can support thousands of courses

One of the Moodle feature is the user management system. The user can enrolled in one of a many course that in the Moodle system. After a user has been authenticated by the site or allowed in as a guest, they are enrolled in courses. Teachers can add an "enrolment key" to their courses to only allow certain students to enter. They can give out this key face-to-face or via personal email etc. Each person requires only one account for the Moodle site - each account can have access to different courses, or resources and activities [4].

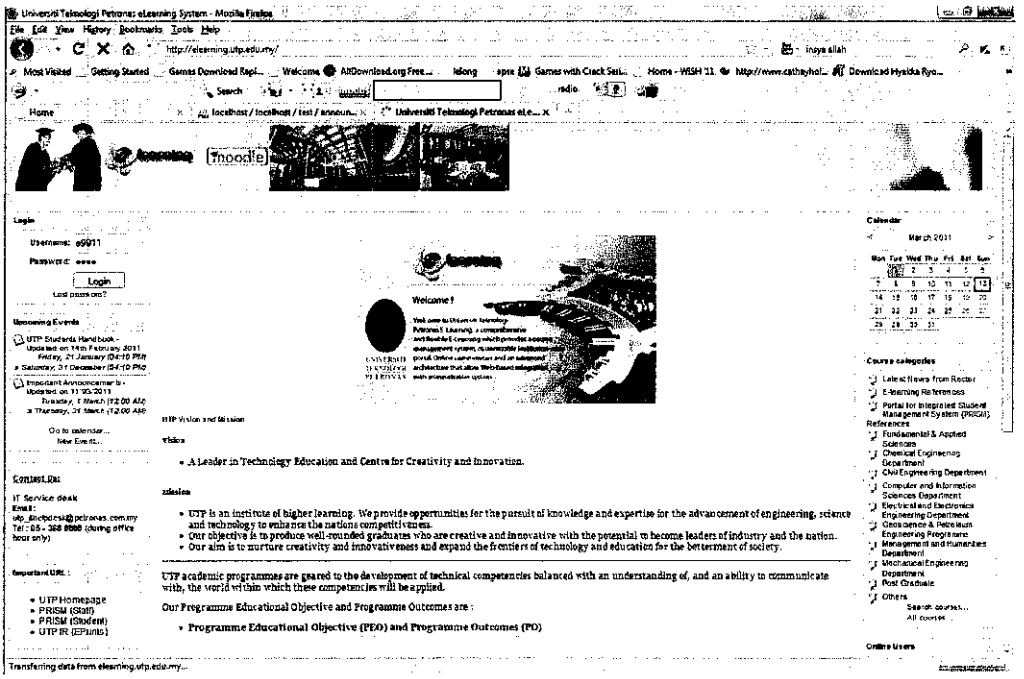


Figure 1: UTP e-learning (Moodle)

2.3 Dunia Matematik

Dunia Matematik is an online magazine that is created to expose students to mathematics beyond the classroom. The magazine has been successfully established since January 2008 and has a number of following participants. The content of the web magazine is updated once a month by the team of authors and editors. It runs on a combination of the Content Management System, Joomla and the Learning Management System, MOODLE. Being a pioneer in Malaysia as a mathematics web magazine, it can serve the community in the access of information as activity participation in a relaxed and recreational manner. These efforts display mathematics not as drill and practice subject, but as a discipline that is in collaboration in many contexts. There are several features of Dunia Matematik that makes it exceed its competitor, plus magazine which is maintained by Cambridge University. The features are the e-forums and the comment boxes that allow students to communicate with each other and share ideas. There is also the quiz section that is created especially for students to revise and practice on their problem solving skills. The sections of Dunia Matematik are laid out so students are able to navigate its content easily. Students can personalize the content by choosing the text size. Students can also submit articles they have written related to mathematics for everyone to read.

Dunia Mathematic is designed based on the ARCS which consist of four stages: Attention, Relevance, Confidence and Saticfaction (Keller, 1987). To motivate students to continue using Dunia Matematik, the attention of the students must be stimulated. Attention has three subcategories: perceptual arousal, inquiry arousal and variability. Perceptual arousal is based on the visual and auditory aspects of the online magazine. Inquiry arousal is present within the articles, where the content is laid out such that it incorporates queries about mathematics in the surrounding. Uses of specific examples that readers can relate to, also arouse inquiry. Variability occurs in Dunia Matematik because its content changes every single month, and the contribution and ideas by readers vary in nature. In learning, relevance is important so students know why they are learning or taking the course. The relevance of using Dunia Matematik is that it is a platform to talk about mathematics on a more personal level, not just on mathematics

classes. The three sublevel categories of Relevance are goal orientation, motive matching and familiarity. The goal orientation is to learn about mathematics beyond the classroom and develop positive attitudes towards mathematics. Familiarity is evident because Dunia Matematik works like any other website. Motive matching means appropriate choise, responsibilities and influences (Takamura et. al, 2008). This is most present when student are able to influence one another on mathematics ideas in the e-forum and comment boxes [14].

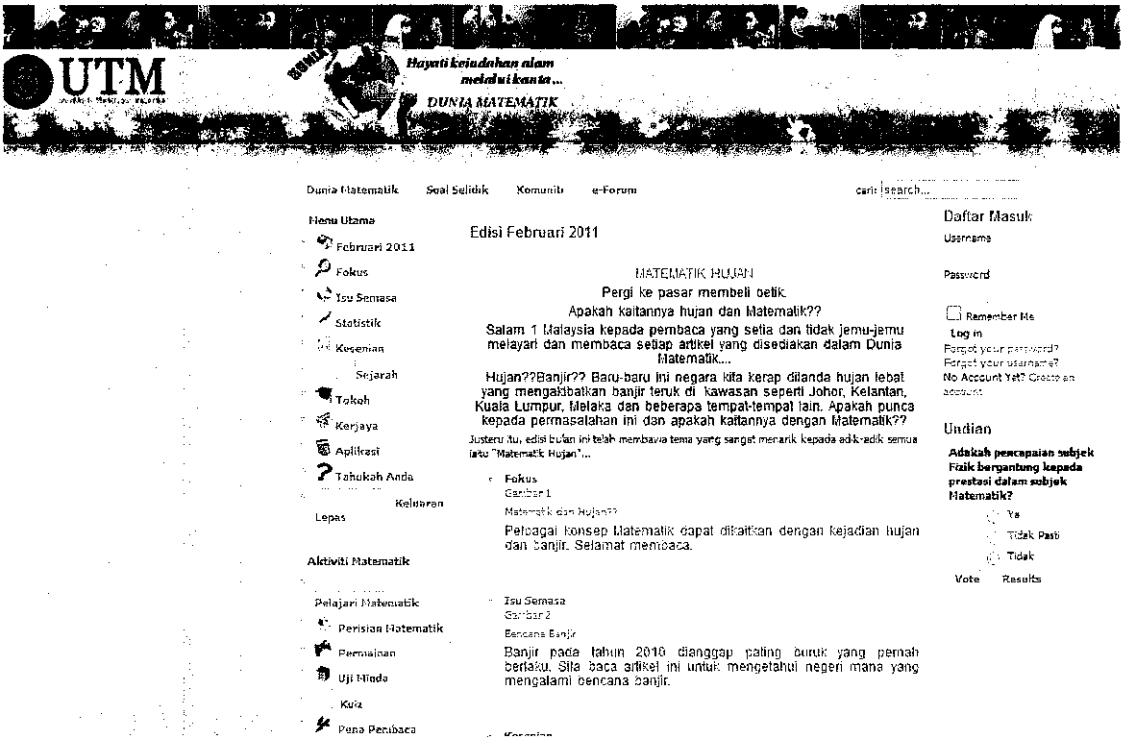


Figure 2: Dunia Matematik

CHAPTER 3

METHODOLOGY

3.1 Procedure of Identification

The tutorial system will be created as a website that can be accesses via the internet. So, the software used is the application that can build an interesting website. The software use is Adobe Dreamweaver. Adobe Dreamweaver (formerly Macromedia Dreamweaver) is a web development application originally created by Macromedia, and is now developed by Adobe Systems, which acquired Macromedia in 2005. Dreamweaver allows users to preview websites in locally installed web browsers. It provides transfer and synchronization features, the ability to find and replace lines of text or code by search terms and regular expressions across the entire site, and a templating feature that allows single-source update of shared code and layout across entire sites without server-side includes or scripting. The behaviors panel also enables use of basic JavaScript without any coding knowledge, and integration with Adobe's Spry Ajax framework offers easy access to dynamically-generated content and interfaces [5].

Dreamweaver can use third-party "Extensions" to extend core functionality of the application, which any web developer can write (largely in HTML and JavaScript). Dreamweaver is supported by a large community of extension developers who make extensions available (both commercial and free) for most web development tasks from simple rollover effects to full-featured shopping carts. Dreamweaver, like other HTML

editors, edits files locally then uploads them to the remote web server using FTP, SFTP, or WebDAV. Dreamweaver CS4 now supports the Subversion (SVN) version control system [5].

The language use in this system is Hypertext Preprocessor or PHP. PHP is a general-purpose scripting language originally designed for web development to produce dynamic web pages. PHP was originally created by Rasmus Lerdorf in 1995. For this purpose, PHP code is embedded into the HTML source document and interpreted by a web server with a PHP processor module, which generates the web page document. The main implementation of PHP is now produced by The PHP Group and serves as the de facto standard for PHP as there is no formal specification. PHP is free software released under the PHP License; it is incompatible with the GNU General Public License (GPL) due to restrictions on the usage of the term PHP [8].

PHP is a general-purpose scripting language that is especially suited to server-side web development where PHP generally runs on a web server. Any PHP code in a requested file is executed by the PHP runtime, usually to create dynamic web page content. It can also be used for command-line scripting and client-side GUI applications. PHP can be deployed on most web servers, many operating systems and platforms, and can be used with many relational database management systems (RDBMS). It is available free of charge, and the PHP Group provides the complete source code for users to build, customize and extend for their own use.

PHP primarily acts as a filter, taking input from a file or stream containing text and/or PHP instructions and outputs another stream of data; most commonly the output will be HTML. Since PHP 4, the PHP parser compiles input to produce bytecode for processing by the Zend Engine, giving improved performance over its interpreter predecessor.

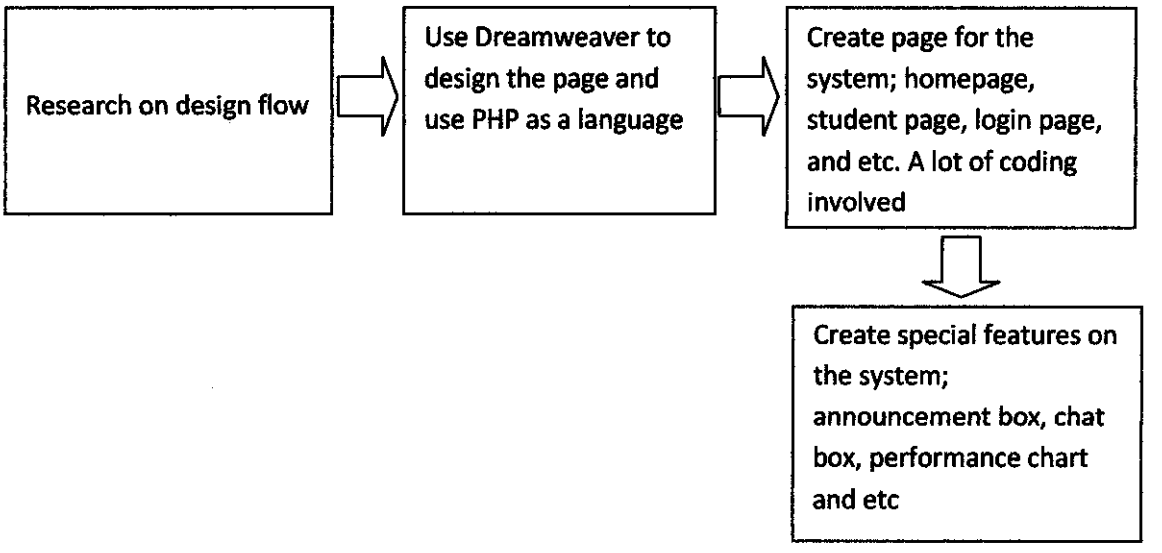
Originally designed to create dynamic web pages, PHP now focuses mainly on server-side scripting, and it is similar to other server-side scripting languages that provide dynamic content from a web server to a client, such as Microsoft's Asp.net, Sun Microsystems' JavaServer Pages, and mod_perl.

The system database used in this system is MySQL. MySQL is a relational database management system (RDBMS) that runs as a server providing multi-user access to a number of databases. MySQL is written in C and C++. Its SQL parser is written in yacc, and a home-brewed lexical analyzer named sql_lex.cc. The official MySQL Workbench is a free integrated environment developed by MySQL AB, that enables users to graphically administer MySQL databases and visually design database structure. MySQL Workbench replaces the previous package of software, MySQL GUI Tools.

Similar to other third-party packages, but still considered the authoritative MySQL frontend, MySQL Workbench lets users manage the following [9]:

- Database design & modeling
- SQL development – replacing MySQL Query Browser
- Database administration – replacing MySQL Administrator

MySQL Workbench is available in two editions, the regular free and open source Community Edition which may be downloaded from the MySQL website, and the proprietary Standard Edition which extends and improves the feature set of the Community Edition.



3.2 Design Consideration

The virtual tutorial design that will be created should [6]:

- run as intended on any browser; failing that, it should at least run on Mozilla and Internet Explorer versions 4 and later
- consist of pages that download in a reasonable time (less than 5 seconds) over a 56K modem
- not require any special software to author or to use (that is, it can't be in a proprietary web-based-training format or require special plug-ins, etc.)
- have system analysis
- have animation for the student to interact and avoid the tutorial become plain and boring.

CHAPTER 4

INITIAL RESULT AND DISCUSSION

4.1 Phase 1: FYP 1

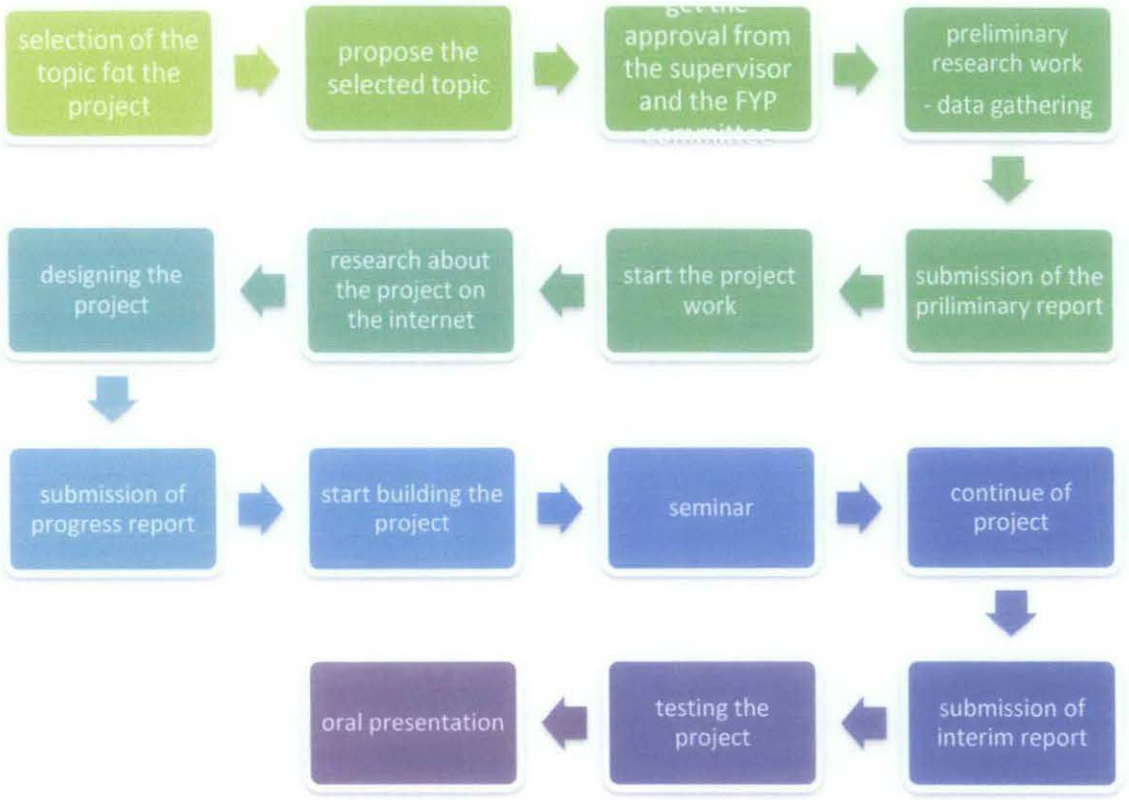


Figure 3: FYP 1 Flow Chart

Figure 3 shows the flow chart for the FYP 1. The flow chart shows the work progress that will be following this path. The project progress now is at the designing of the project part. The designing of the project is being done after the research about the project. The research is being done through the internet about the construction of the virtual tutorial. The virtual tutorial will be created by using virtual basic. So, the research is about study on virtual basic.

This is the initial design of the project or the virtual tutorial. The design will be consist of interface, database, animation, content and system flow.

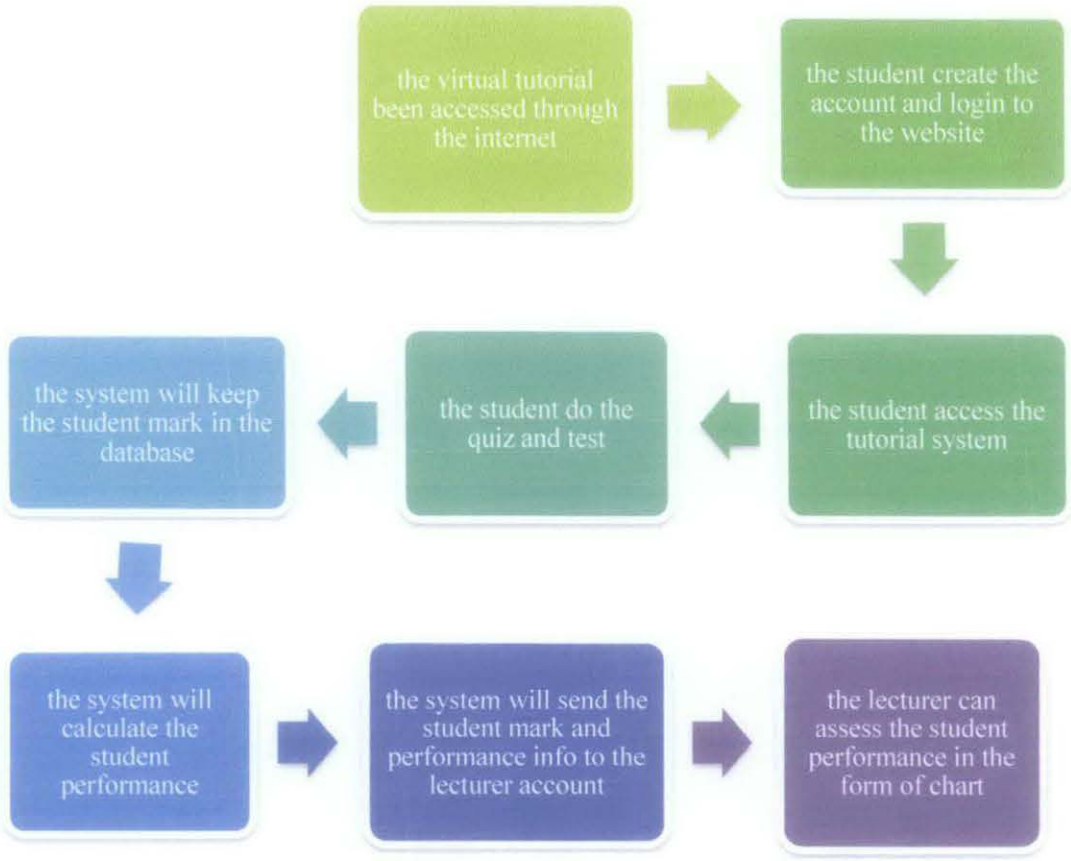


Figure 4: Virtual Tutorial System Flow Chart

4.1.1 The early stage of the system

For the early phase of system development which is during FYP1, the first step is to do a research. The research is about how the system should look like and behave. The research about the system is been done over the internet and some research paper. Then the general idea about the system behavior and layout will come to mind. Internet provides many examples on how the system layout because this kind of system can be gets easily on the internet. The layout use in this system is a basic layout use in website development because to make people familiar with the system. With a general layout, the system accessibility will become easy to the people.

After done the research on layout and system behavior, the construction of the system is begin to take place. The system is build by using Microsoft Visual Basic 2008. The system use ASP.NET as the website development language. The main feature of the ASP.NET is that we can control the page layout with master page. The master page provides the template for the content. The content is defined for the master page by creating an ASP.NET page that is associated with the master page. The content page is a specialized form of an ASP.NET page that contains only the content to be merged with the master page. In the content page, the text is added and controls that will be displayed when users request that page.

The development of the website layout is the title, header, list, content and footer. The page arrangement also used the general arrangement. First, the user will see the Homepage of the system. The Homepage usually show the introduction of the system and also the login layout. If the user wants to access the further page, they need to login first. So, only registered user can access the system content fully.

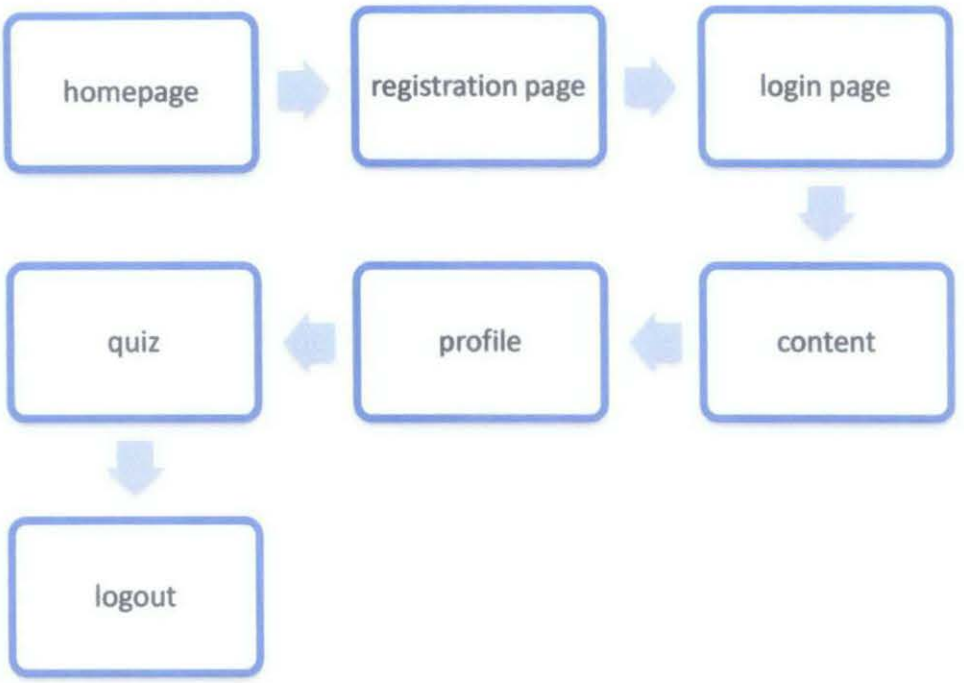


Figure 5: Page arrangement

The user can register to the system at the registration page. The user will be given one account each. They need to fill in some form about their details. The details then will be stored in the system database.

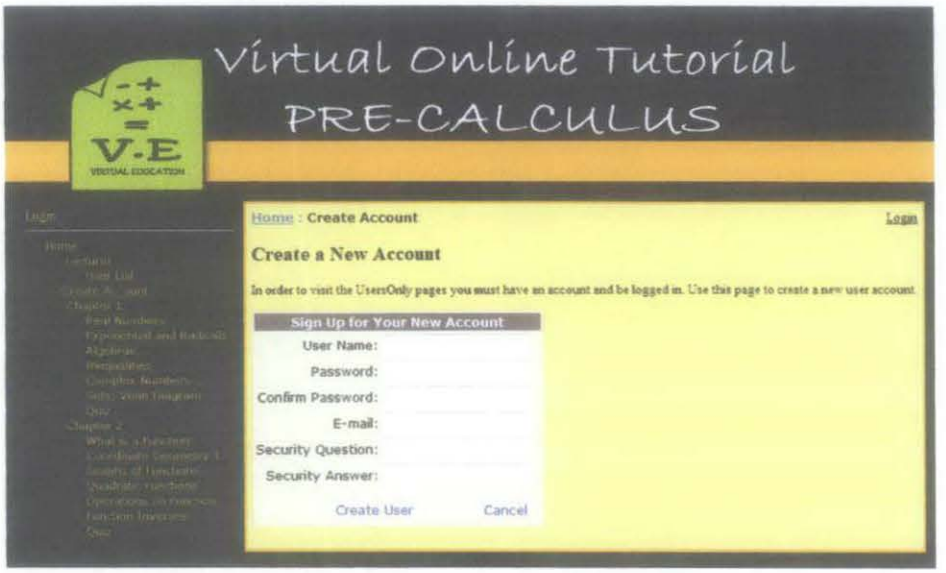


Figure 6: Registration page

4.1.2 Master Page

A content page does not have the usual elements that make up an ASP.NET page, such as html, body, or form elements. Instead, only the content that will be display on the master page is being added by replacing the placeholder regions that been created in the master page. This is the example of content code in master page coding:

```
<div class="main">
        <div style="float:right;">
            <asp:LoginStatus ID="LoginStatus3" runat="server" />
        </div>
        <asp:SiteMapPath ID="SiteMapPath1" runat="server" Font-
Names="Verdana" PathSeparator=" : ">
            <PathSeparatorStyle Font-Bold="True" ForeColor="#5D7B9D" />
            <CurrentNodeStyle ForeColor="#333333" />
            <NodeStyle Font-Bold="True" ForeColor="#7C6F57" />
            <RootNodeStyle Font-Bold="True" ForeColor="#5D7B9D" />
        </asp:SiteMapPath>
        <asp:contentplaceholder id="ContentPlaceHolder1"
runat="server">
        </asp:contentplaceholder>
    </div>
    </form>
```

As been shows in the above coding, the coding for the content is been given a " ". This is a name given to the placeholder regions that will shows that content in the master page. Figure 7 shows that the content for the " " is "HOME". The content for the " " is depend on the user request on the list next to it.

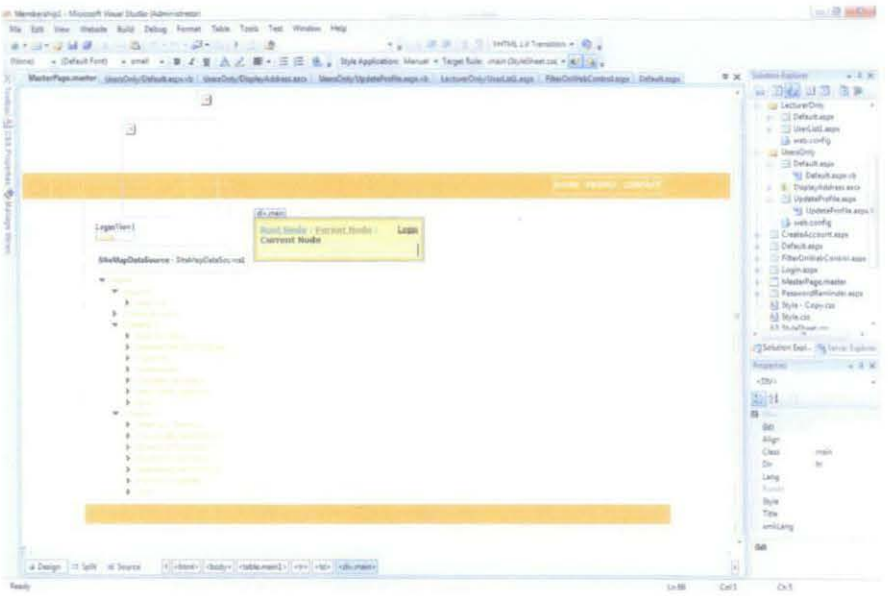


Figure 7: Master Page in Microsoft Visual Basic

The content of "HOME" is being created in a different page or file. Master page only display the content but the content is on different file. The coding example for the " ":

```
<%@ Page Language="VB" MasterPageFile="~/MasterPage.master"
AutoEventWireup="false" CodeFile="Default.aspx.vb"
Inherits="_Default" title="Untitled Page" %>
<asp:Content ID="Content1"
ContentPlaceHolderID="ContentPlaceHolder1" Runat="Server">
    <h2>HOME</h2>
    <p>You can log in to the site by visiting the <a
href="Login.aspx">Login page</a>.
    <p>You can also create a new account.</p>
    <p>
        All users can visit any page in the site's root directory.
However, only <em>authenticated users</em> can visit the ASP.NET
pages in the UsersOnly folder.
</asp:Content>
```

4.1.3 Web.sitemap

Web.sitemap is a file that will map the web page in the Master page. It will create the list of the content that can be browse in the master page. The list is being made up in different page with .xml format. The list is being link from the .xml format file to the master page with this example of coding:

```
<asp:SiteMapDataSource ID="SiteMapDataSource1" runat="server" />
```

Then, to arrange the list in the Web.sitemap file and view it in the master page, the coding is as follow:

```
<asp:TreeView ID="TreeView1" runat="server" ImageSet="Arrows"
            DataSourceID="SiteMapDataSource1" HoverNodeStyle-Font-
Overline="False"
            Width="199px">
            <ParentNodeStyle Font-Bold="False" />
            <HoverNodeStyle Font-Underline="True" ForeColor="Black" />
            <SelectedNodeStyle Font-Underline="True" ForeColor="Black"
HorizontalPadding="00px" VerticalPadding="0px" />
            <NodeStyle Font-Names="Verdana" Font-Size="8pt"
ForeColor="#000099"
                HorizontalPadding="5px" NodeSpacing="0px"
VerticalPadding="0px" />
        </asp:TreeView>
```

This is the content of Web.sitemap file:

```
<?xml version="1.0" encoding="utf-8" ?>
<siteMap xmlns="http://schemas.microsoft.com/AspNet/SiteMap-File-1.0" >
    <siteMapNode url="~/Default.aspx" title="Home">
      <siteMapNode url="~/lectureronly/Default.aspx" title="Lecturer"
description="" >
        <siteMapNode url="~/lectureronly/UserList1.aspx" title="User
List"  description="" />
      </siteMapNode>
      <siteMapNode url="~/CreateAccount.aspx" title="Create Account"
description="" />
      <siteMapNode url="~/Chapter1/home.aspx" title="Chapter 1" >
        <siteMapNode url="~/Chapter1/1.aspx" title="Real Numbers" />
        <siteMapNode url="~/Chapter1/2.aspx" title="Exponential and
Radicals" />
        <siteMapNode url="~/Chapter1/3.aspx" title="Algebraic" />
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        <siteMapNode url="~/Chapter1/6.aspx" title="Sets: Venn Diagram"
/>
        <siteMapNode url="~/Chapter1/7.aspx" title="Quiz" />
      </siteMapNode>
      <siteMapNode url="~/Chapter2/home.aspx" title="Chapter 2" >
        <siteMapNode url="~/Chapter2/1.aspx" title="What is a
Function?" />
```

```
        <siteMapNode url="~/Chapter2/2.aspx" title="Coordinate Geometry
1" />
        <siteMapNode url="~/Chapter2/3.aspx" title="Graphs of
Functions" />
        <siteMapNode url="~/Chapter2/4.aspx" title="Quadratic
Functions" />
        <siteMapNode url="~/Chapter2/5.aspx" title="Operations on
Function" />
        <siteMapNode url="~/Chapter2/6.aspx" title="Function Inverses"
/>
        <siteMapNode url="~/Chapter2/7.aspx" title="Quiz" />
      </siteMapNode>
    </siteMapNode>

</siteMap>
```

From the content of the Web.sitemap file, the list of content is being created in the master page. The user can navigate the master page by clicking the list as shown in Figure 8.

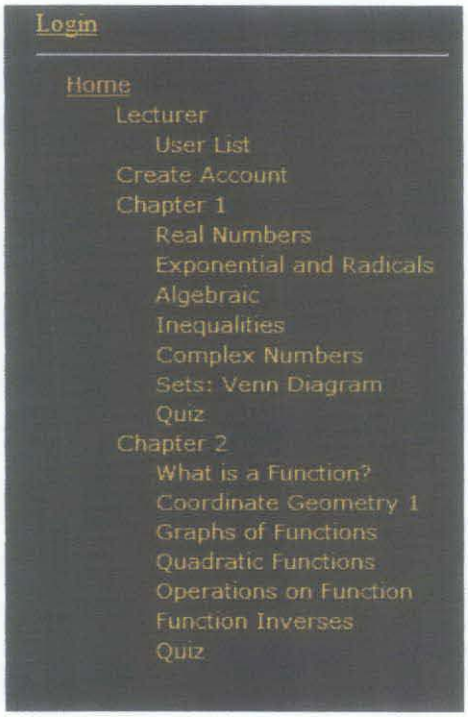

Figure 8: List of content

4.1.4 Login

In master file, we can create the login function. Login.aspx is the file to which the request gets redirected if ASP.NET does not find the form with the request. The URL of the file should be set up in the application root configuration file. A form containing two text boxes (User Name and Password) and a Submit button is presented to the client user. The user enters the user name and password, and clicks the Submit button. The code then checks to see if this name and password is contained in the database. If it is, the user is redirected to the desired page. If it is not, the user is directed to the register page to register an account.

Create a script section for the code.

```
<asp:Login ID="Login1" runat="server"...
```

Figure 9 show a login page in the master page. The user must login first or they cannot navigate the content in the website. On the lecturer page, only the lecturer can navigate the page. The lecturer page is on the higher security level set by the admin.

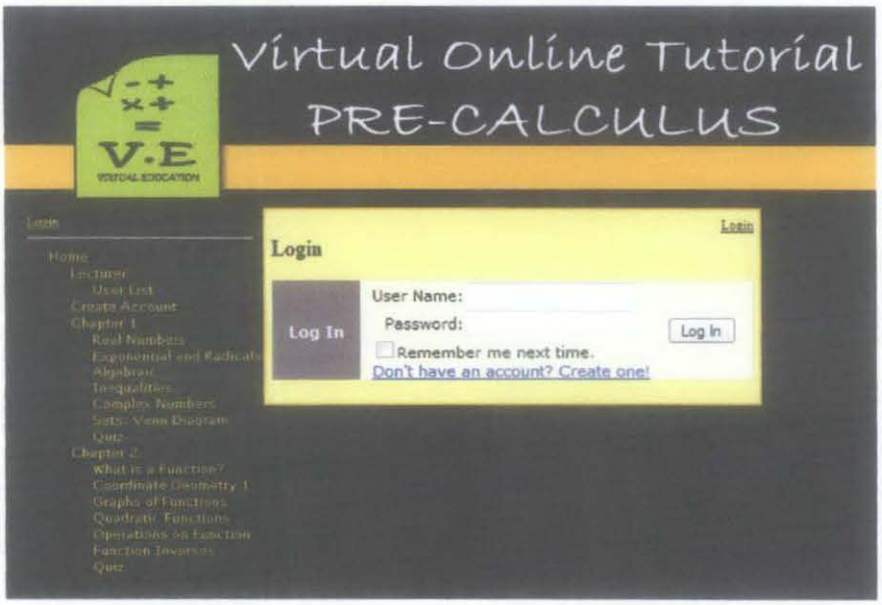

Figure 9: Login Page

So, the content of the website only can be navigated by the registered user. The content of the website can only be view by the pre-calculus student only. This will make the content more confidential. For the lecturer page, only the lecturer account can access the page. The page will contain the information that cannot be view by the student. This we see the different in security level on the page. So, the lecturer page will be more secure from others.

For the lecturer page, the security level is set in the web.config. The coding is:

```
<?xml version="1.0" encoding="utf-8"?>
<configuration
xmlns="http://schemas.microsoft.com/.NetConfiguration/v2.0">
    <system.web>
        <authorization>
            <allow users="lecturer" />
            <deny users="*" />
        </authorization>
    </system.web>
</configuration>
```

And insert this coding in the script of the page that will be the lecturer's page:

```
...Inherits="lecturer_Default"...
```

The above coding will make sure that the page for the lecturer will be secure and only can be accesses by the user id "lecturer". The setting for the intended user for access the page is at "<allow users="lecturer" />". If the admin want to change into someone else user id, the admin will change the "lecturer" into someone else user id.

4.2 Phase 2: FYP 2

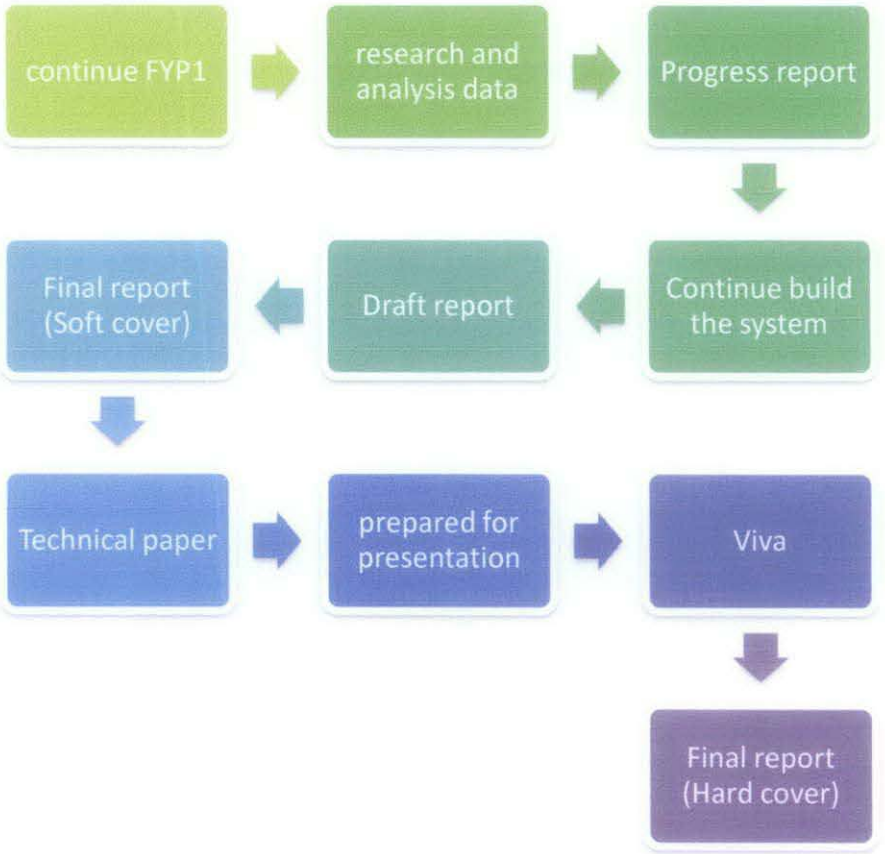

Figure 10: FYP 2 Flow Chart

Figure 10 shows the flow chart for the FYP 2. The flow chart shows the work progress continues from FYP1. The project progress now is at the continuation of FYP1 project part. The building of the project is being done after the research about the FYP1 project. The research is being done through the internet about the construction of the virtual tutorial. The virtual tutorial will be created by using virtual basic. So, the research is about study on virtual basic.

The second phase or FYP2 is the phase to complete the system. The system is being inserted with many features to make it more secure and more interesting. The features are Captcha, announcement box, instant messaging, performance graph, table export and many more. The details about all of that will be explain later in this section.

4.2.1 The upgrade

Firstly, the system is created for the student to access the pre-calculus over the internet. To do so, the student must create the account. The system will hold the student database that contains their information. The student will fill up a form and insert their details such as name, student id, address, phone number, course and etc. The students detail in the database can be access by the lecturer. The lecturer can see the detail about the students and also their achievement in the quiz taken in the system. The students can only make one account for each of them and to prevent the account being created automatically by the script, the Captcha is inserted in the form.

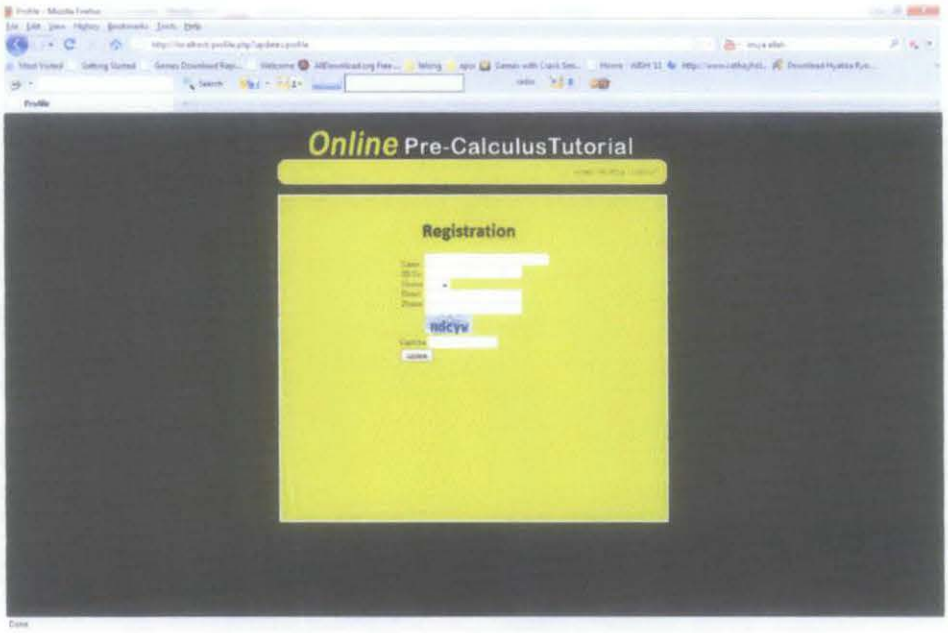

Figure 11: Registration Page

4.2.2 Captcha

A Captcha is a type of challenge-response test used in computing as an attempt to ensure that the response is not generated by a computer. The process usually involves one computer (a server) asking a user to complete a simple test which the computer is able to generate and grade. Because other computers are supposedly unable to solve the CAPTCHA, any user entering a correct solution is presumed to be human. Thus, it is sometimes described as a reverse Turing test, because it is administered by a machine

and targeted to a human, in contrast to the standard Turing test that is typically administered by a human and targeted to a machine. A common type of CAPTCHA requires the user to type letters or digits from a distorted image that appears on the screen [7].

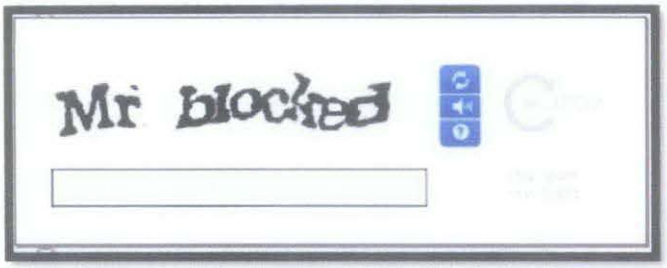

Figure 12: CAPTCHA

CAPTCHAs are used in attempts to prevent automated software from performing actions which degrade the quality of service of a given system, whether due to abuse or resource expenditure. CAPTCHAs can be deployed to protect systems vulnerable to e-mail spam, such as the webmail services of Gmail, Hotmail, and Yahoo! Mail. As of 2010, most CAPTCHAs display distorted text that is difficult to read by character recognition software. The alternative implementations may include various tests, such as identifying an object that does not belong in a particular set of objects, locating the center of a distorted image, or identifying distorted shapes [7].

As for the system, the CAPTCHA act as one of the system security and prevent the system database from going overload by computer generated account. When the user fill up the account registration form, they also need to complete the CAPTCHA and after the server validated the CAPTCHA, then the registration is complete.

4.2.3 Homepage

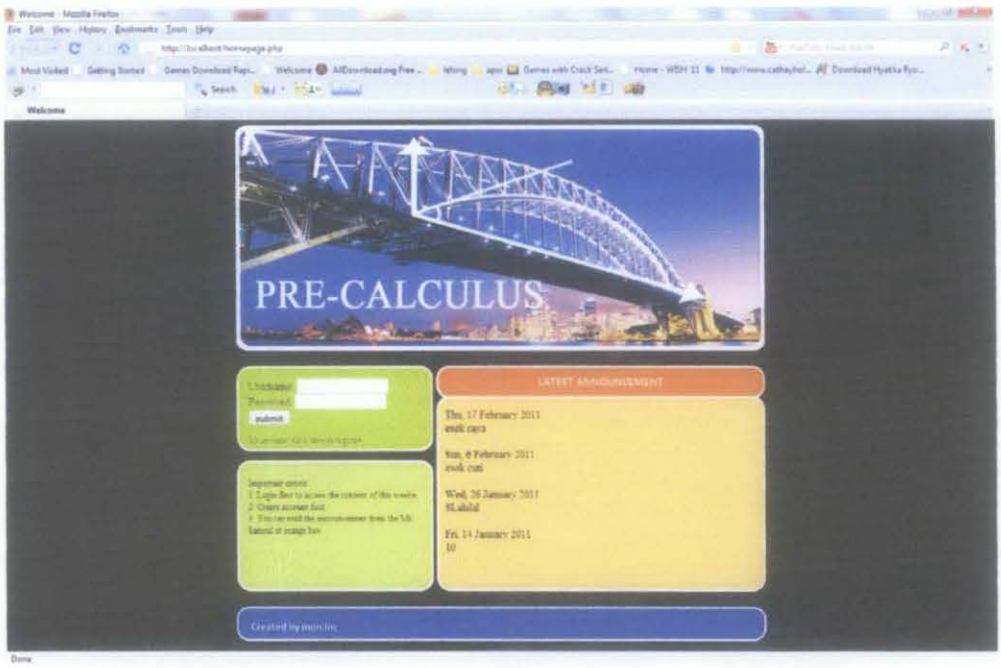

Figure 13: Homepage

Figure 13 show the homepage of the system. Homepage is the first page that user will see when they open the system. From this page, the user can login to their account and anyone without account cannot go further than this page. This page will be the default page for everyone because when the fail or wrongly login the username and password, they will be redirect to this page. Below the login box, there is the link to the registration page, and the user can create the account there.

The special feature on homepage is the students can see the announcement from the lecturer. The lecturer can give the announcement from his account and the students can see it at the homepage. Without login into the system the user can see the latest announcement so that the user can see the announcements directly without bother them to login. This because the information is important to the student. Unlike Moodle or elearning, to see the announcement, the students need to login first, and if the server is down, or having a slow internet connection, the student cannot reach the intended page and thus the lecturer important message don't reach the student. This is one of the improvements to the current system.

Figure 14 show the announcement box in lecturer page. The lecturer will insert the announcement in the box provided and the announcement can be seen at the website Homepage.

Figure 14: Lecturer Announcement Box

Figure 15 show the announcement box that the students can see in website Homepage. It contain the date of announcement been made and the announcement content. The latest announcement will be at the top as the old announcement will be stack down.

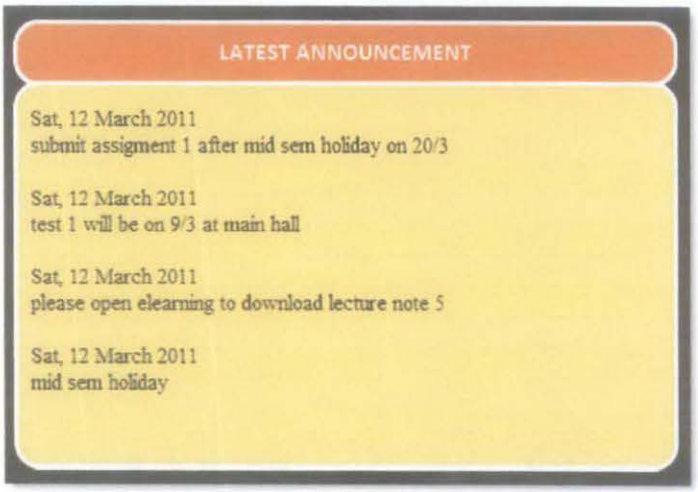

Figure 15: Announcement Box

4.2.4 Layout

Figure 16 shows the welcome page of this system. The user will be directed to this page after they login into the system. This welcome page uses the basic layout of the website. It has title at the top, header, list of content at the left hand side and the content in the middle. This basic layout has been use widely in the website construction.

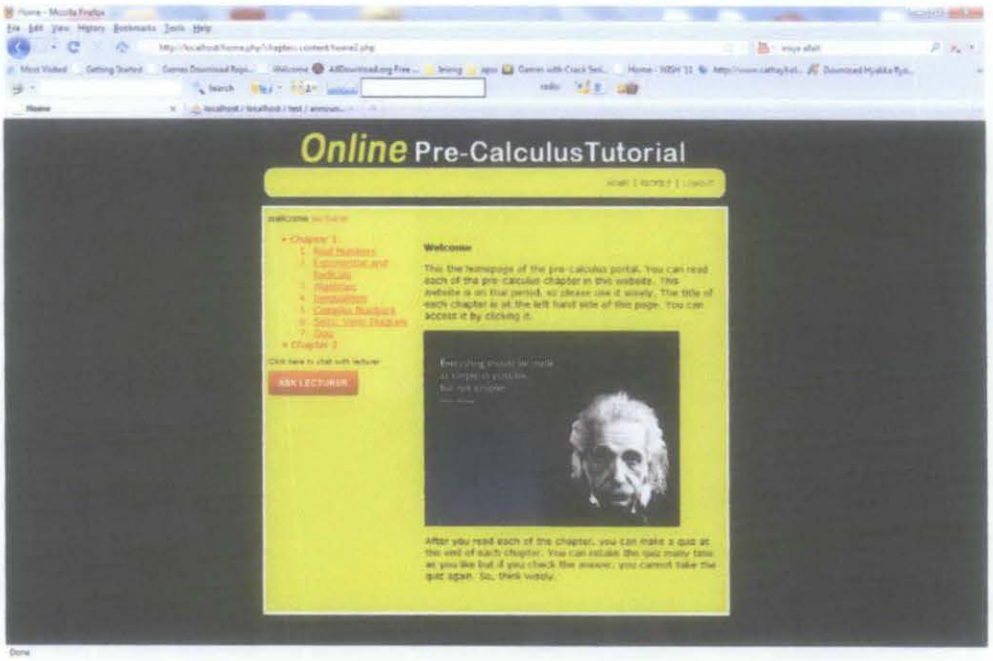

Figure 16: Welcome page

This attribute is user friendly as they familiar with the website layout and can access the system easily in no time without much effort. The header usually contains the link to the other page. On this system, there is link for Home, Profile and Logout. The Profile link will move the user into their profile page. At the left hand side of the page, there is the list of each chapter. When the user click the chapter, the content in the middle will change to the respective chapter without changing the page. This follows the master page style in ASP.NET. This master page attribute will make the coding more simple and creating coding for header, list of content for each page. With master page style, each content page only has coding for content only and only required one page for the page to become master page.

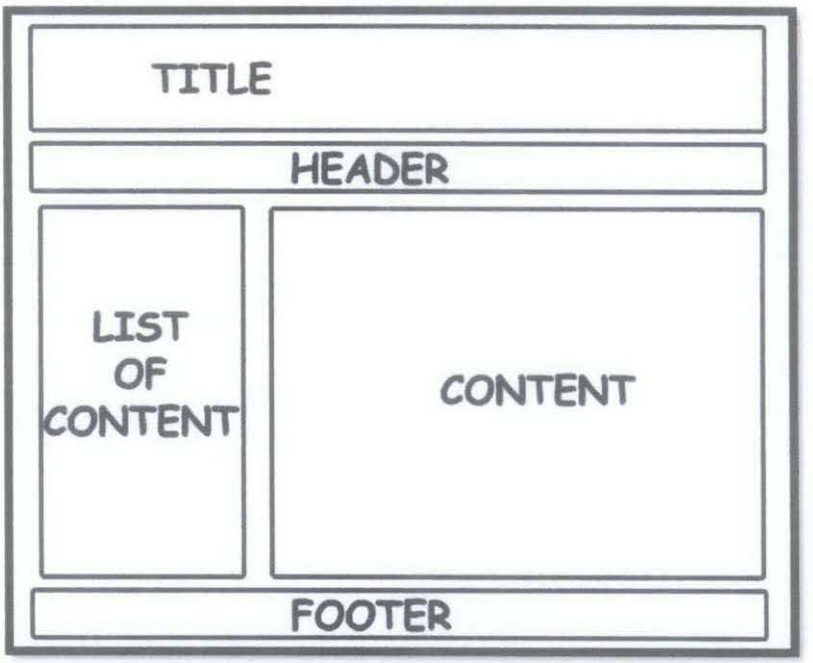

Figure 17: Website basic layout

```
<table class="header">
        <tr>
          <td style="padding-right:20px">
        <a class="a" href="content/sitemap.php?ch=1&tajuk=0">HOME</a> |
        <a class="a" href="profile.php">PROFILE</a> |
      <a class="a" href="logout.php">LOGOUT</a>
      </td>
  </tr>
</table>
```

Above is the coding example of header. It being place it the coding table, <table class = "header"> for the open tag and </table> is the close tag for table. Tag <a class="a" href="content/sitemap.php?ch=1&tajuk=0"> is the link tag for the "HOME".

```
<?php
        $username = $_SESSION['username'];
        $con = mysql_connect("localhost","mon","mon123");
        if (!$con)
        {die('Could not connect: ' . mysql_error());}
        mysql_select_db("test", $con);
        $result = mysql_query("SELECT * FROM akaun WHERE username = '$username'");
        while($row = mysql_fetch_array($result))
                {$temp = $row['temp'];}
        mysql_close($con);
?>
```

This is the coding for database connection. This coding will connect the web page to the MYSQL database in the server. Above coding is to select the item from the database and show it in the web page in the table. The item in the database is being stored in table. So to access it, the tag for select the item is "("SELECT * FROM akaun WHERE username = '$username'")". "akaun" is the database name and "username" is the table name in the database.

```
<ul><li class="ch">Chapter 1</li>
<ol type="1">
<li><a href="content/sitemap.php?ch=1&tajuk=1"> Real Numbers </a></li>
<li><a href="content/sitemap.php?ch=1&tajuk=2"> Exponential and Radicals </a></li>
<li><a href="content/sitemap.php?ch=1&tajuk=3"> Algebraic </a></li>
<li><a href="content/sitemap.php?ch=1&tajuk=4"> Inequalities </a></li>
<li><a href="content/sitemap.php?ch=1&tajuk=5"> Complex Numbers </a></li>
<li><a href="content/sitemap.php?ch=1&tajuk=6"> Sets: Venn Diagram </a></li>
```

Above is the coding for list of content that placed at the left hand side of the welcome page. Tag "<a href=" is the tag for the link for each page and in the internet browser, the layout for the list is shown as in figure 18.

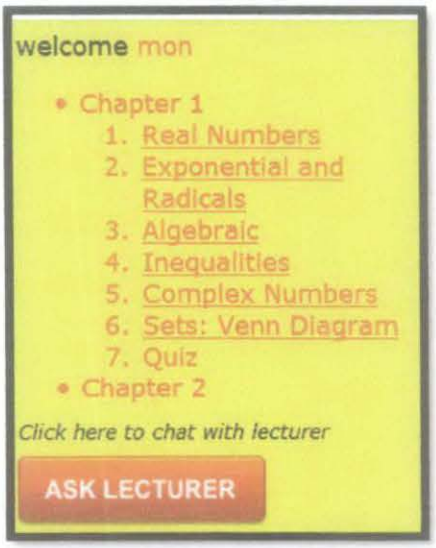

Figure 18: List of Content

4.2.5 Student page

The user will be directed to the welcome page after they login into the system. The special feature in welcome page is the student can chat with the lecturer. If the student don't understand about what he or she had read, they can ask directly to the lecturer. There is "ASK LECTURER" button as can be seen in figure 18, it is a chat button with the lecturer. After click that button, there will be a small chat box at the bottom right of the browser as can be seen in figure 19. The student can write anything and it will directly connect to the lecturer account. If the lecturer is online, the lecturer can reply it on the spot, but if the lecturer is offline, the lecturer will receive the chat after login into the system. This is to provide two way communications as for the tutorial, two way communications is a crucial point. The student not only can read the material in the website, but also can ask the lecturer if he or she don't understand it. It is the essential of tutorial.

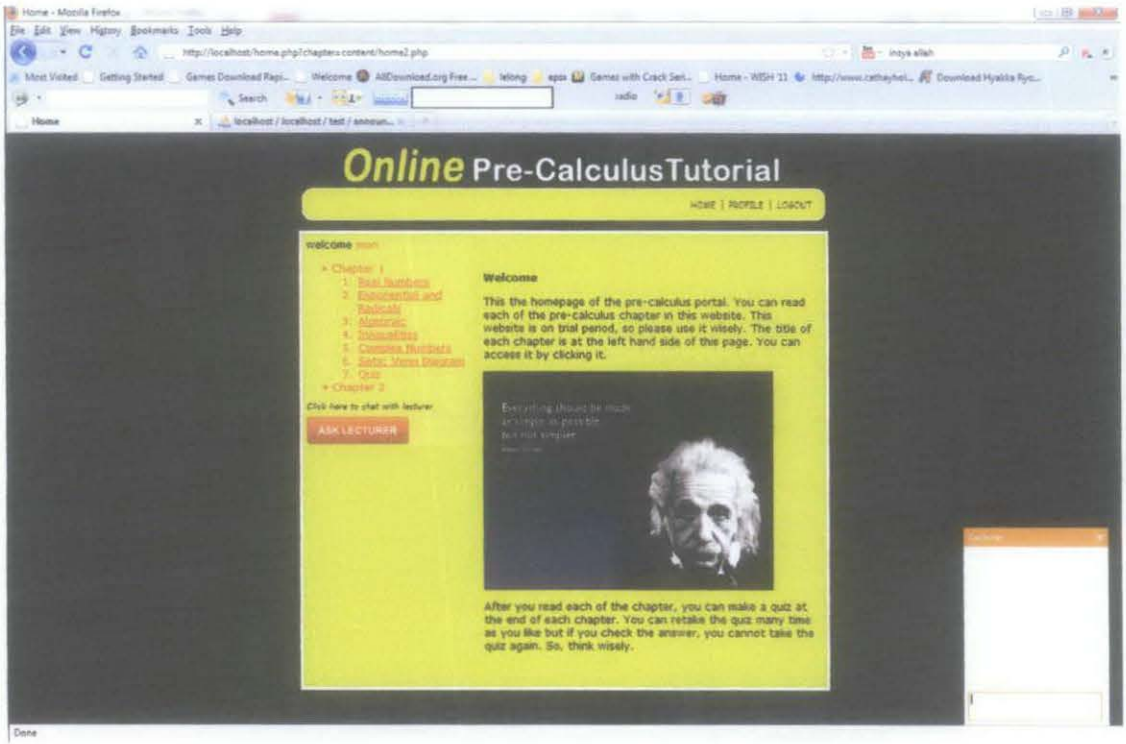

Figure 19: Welcome page with chat box at bottom right

4.2.6 The Quiz

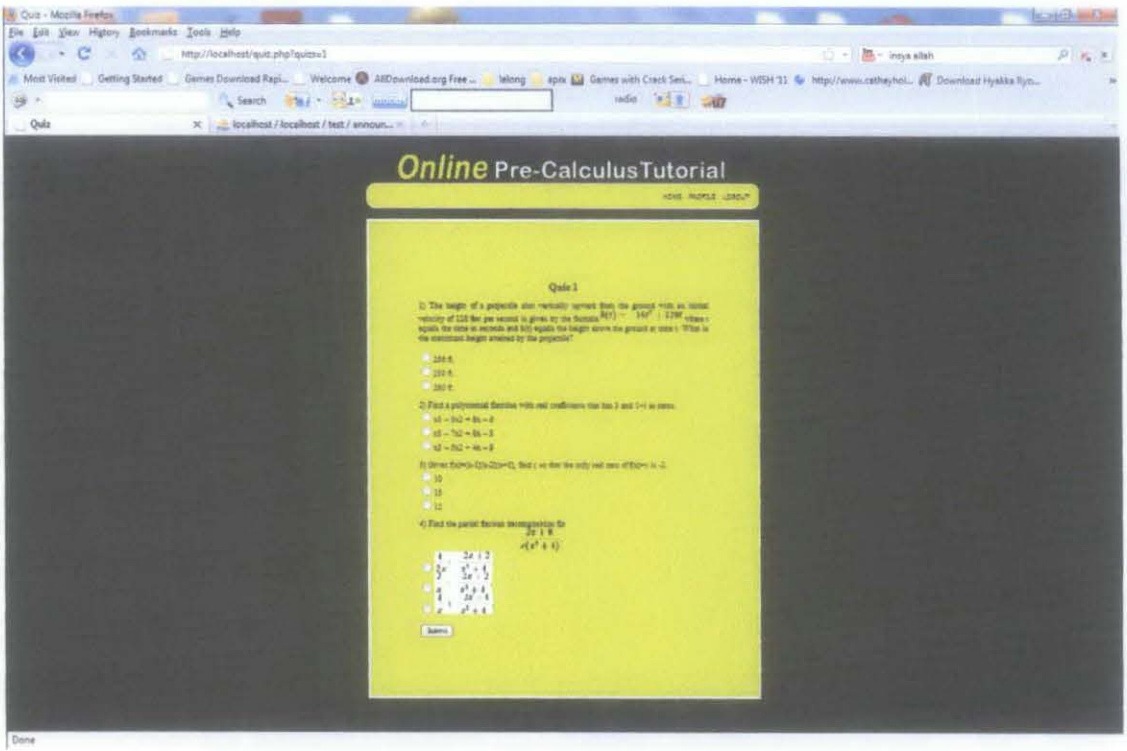

Figure 20: Quiz

After read the material in the website, the students can test themselves by take a test. The test is given in each chapter. This is to test their understanding about the course. After they do the test, they will get the result on the spot and if not satisfy with the mark, they can redo the test. This only happen they don't click the check answer button. After the answer is revealed, they cannot take the quiz anymore. The mark from the quiz will be store in the student database. Their performance will be calculated and will be shown in bar chart at profile page. The student and lecturer can use this chart to see which chapter is their weakness.

4.2.7 Performance chart

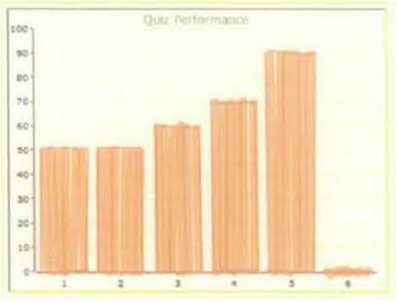

Figure 21: Performance chart

The chart is being created by using Flash software. Flash is one of the interactive software that been use in website development and it can give dynamic interface. The dynamic interface can make the presentation of the website more interesting and catch the user eye to use it many times. So, this will make the system more interesting, eye catchy and not plain. It is important to grab student intention to use this system because if it plain and simple, is same like use the UTP e-elearning (Moodle).

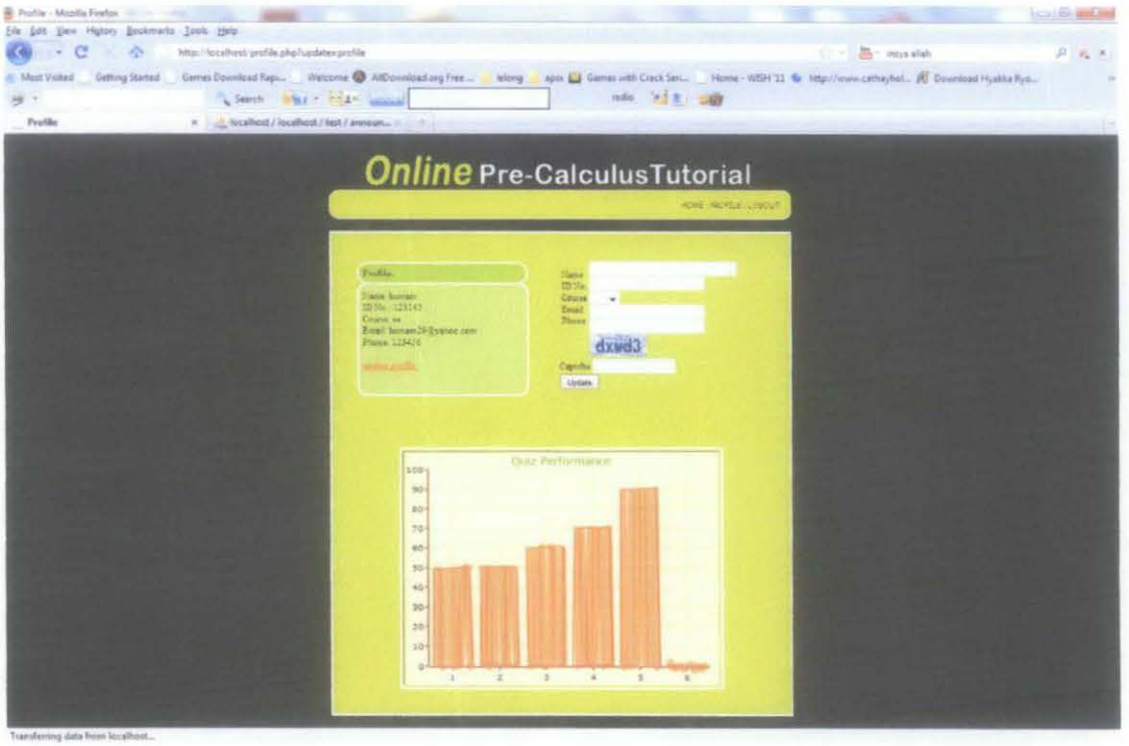

Figure 22: Profile page

Finally, the website is been designed by using a combination of color so that it will be eye catching. It is make that way so that the student will not fell boring and sleepy during study. Younger generation nowaday prefer a fancy look and by making the website that way, it can gain their interest to access this website.

4.2.8 Special Features

This tutorial system is being fused with some features. It is to make the system more interesting and more friendly user. Some of the feature is the improvement of the other system.

4.2.8.1 Announcement Box

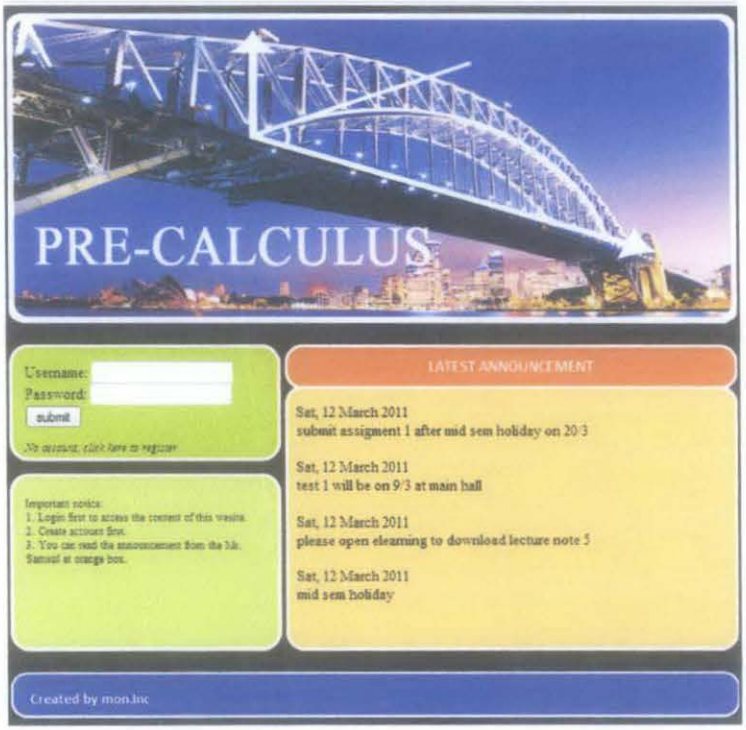

Figure 23: Announcement box in Homepage

Announcement box is a must in every website. It can deliver admins or instructor word to the public or respective user. As for the tutorial type system, it will make the instructor become easier to give the instructions. It is important in the tutorial type system because it will indicate the important of instructor words.

The announcement box in this system is at the very front page of the system or the first page user will see when they open the system. The announcement box contain the lecturer announcement and the date it being created. The user can check whether the announcement is already old or a latest by see the date it being created. The announcement box is designed to stack the new announcement in the top of the box. As for the old announcement, it will stack down and will deleted by itself if exceed 4 announcement at one time. Only lecturer can update the announcement box by login into the lecturer page. There is box provided for the lecturer to insert the announcement.

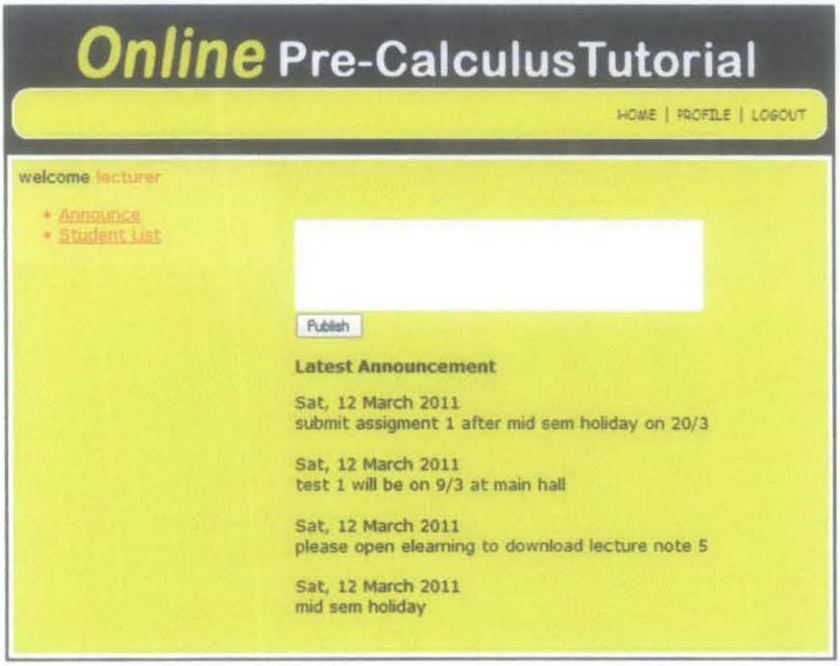

Figure 24: Lecturer page

UTP e-learning or Moodle also have it own announcement box. As mention before, it is a must in every website but the placement, usage and the presentation of the announcement box is differ from one website to other. As for the UTP e-learning, the announcement box is in the course page. The student must login first to see the

announcement from the lecturer of respective course. Sometimes, when the internet become slow because of high traffic, the student cannot login to the server and thus cannot reach the intended destination page to see the lecturer announcement. This will make the announcement unreachable to the student.

The improvement in this tutorial system is the announcement box is placed at the homepage of the system. The users don't need to login first to see the announcement. It can save the user time for those who only want to see the announcements. Second, if the internet become sluggish and slow, the user still can see the announcement because the loading time is reduced without login and connect to the server database. This it is the advantages for only having one course in one system.

4.2.8.2 Ask Lecturer feature

The meaning of tutorial is to have a two way communication between the instructor and the users or students. In class tutorial, the instructor will assist the students in their homework or question problems. But in the virtual system, many of the tutorial website developer like to implement the instant messaging (I.M) in their website. Instant messaging (IM) is a form of real-time direct text-based communication between two or more people using personal computers or other devices, along with shared clients. The user's text is conveyed over a network, such as the Internet. More advanced instant messaging software clients also allow enhanced modes of communication, such as live voice or video calling. The advance implementation in tutorial website is video conference. The user can ask the enquiries to the instructor face to face. Video conference may seem more magnificent but it consumes more internet bandwidth and for the worst case, it can overload the server bandwidth.

The "ASK Lecturer" is instant messaging feature in this system. It provides a two way communication for the system. The feature is placed in the user page. They can access it after they login into the system. So, only the registered user can chat with the lecturer. To open the chat box, the user can click the "ASK Lecturer" button and the

chat box will pop up at bottom-left of the browser window. The chat content in the chat box will be stored in the server database and the lecturer will receive it once he/she login into the system.

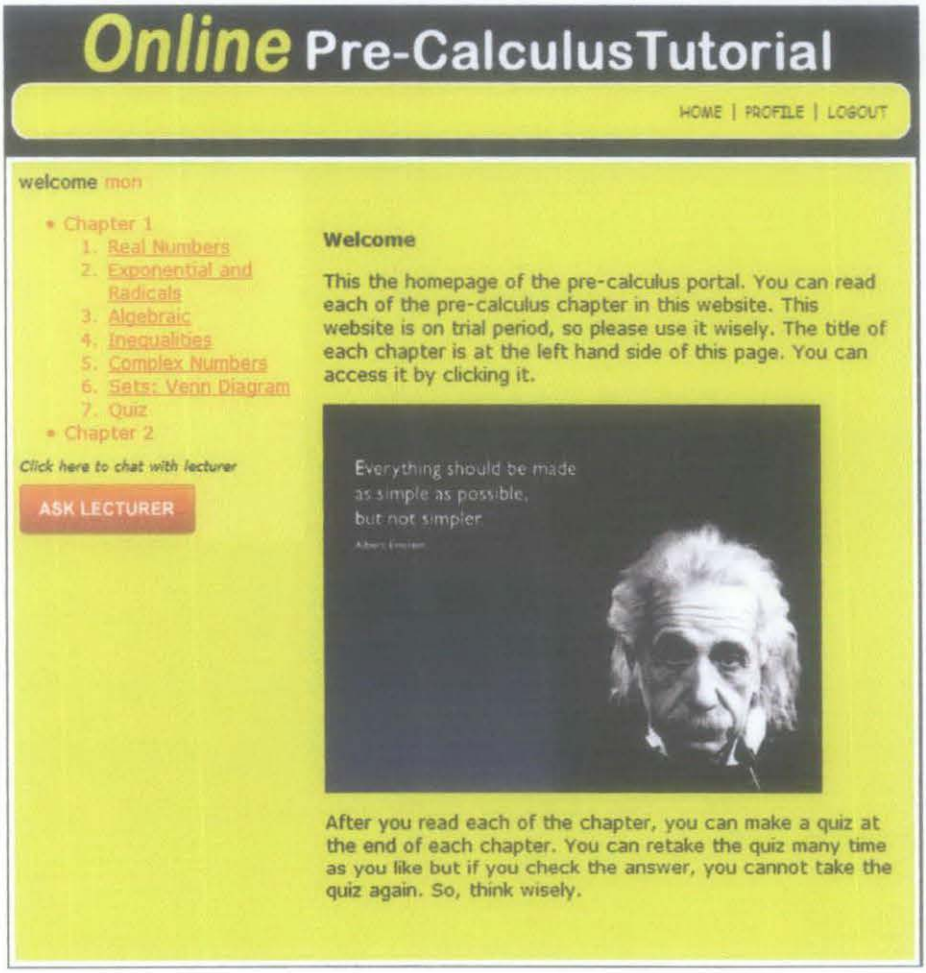

Figure 25: "ASK LECTURER" button

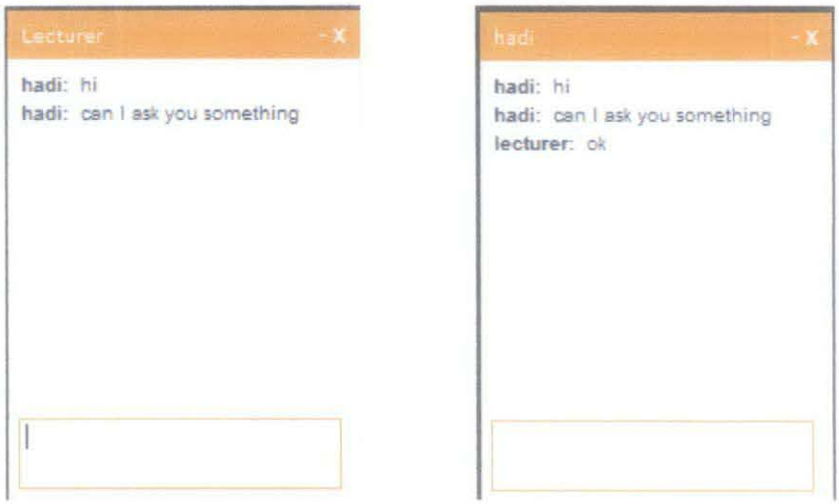

Figure 26: Chat box between the user and the lecturer

The chat box is easy to use by the student because to use it, user only needs to click one button only. That why the system is user friendly and not complicated for a beginner. The design of the chat box follows the shape of chat box in the Facebook.com. The student will feel familiar with the chat box and thus can use it without complication and also the design will make it more interesting.

4.2.8.3 Database table Sorting & Export to Microsoft Excel

A database is a system intended to organize, store, and retrieve large amounts of data easily. It consists of an organized collection of data for one or more uses, typically in digital form. One way of classifying databases involves the type of their contents, for example: bibliographic, document-text, statistical. Digital databases are managed using database management systems, which store database contents, allowing data creation and maintenance, and search and other access. A database management system (DBMS) consists of software that operates databases, providing storage, access, security, backup and other facilities. Database management systems can be categorized according to the database model that they support, such as relational or XML, the type(s) of computer they support, such as a server cluster or a mobile phone, the query language(s) that

access the database, such as SQL or XQuery, performance trade-offs, such as maximum scale or maximum speed or others [10].

The database in the tutorial system is used to store the student details and information. The database use is MySQL and the language is PHP in the webpage. The information is inserted by the student during registration. The performance of the student in quizzes also being updated into the database automatically by the system. The lecturer also can update the student coursework over the system. Furthermore, the system will calculate the student performance and preview it the lecturer page in shape of table. The normal table cannot be sort to group the detail in the table. But with some modification and research, the table can be sort and filtered to show the detail of the students by course and etc.

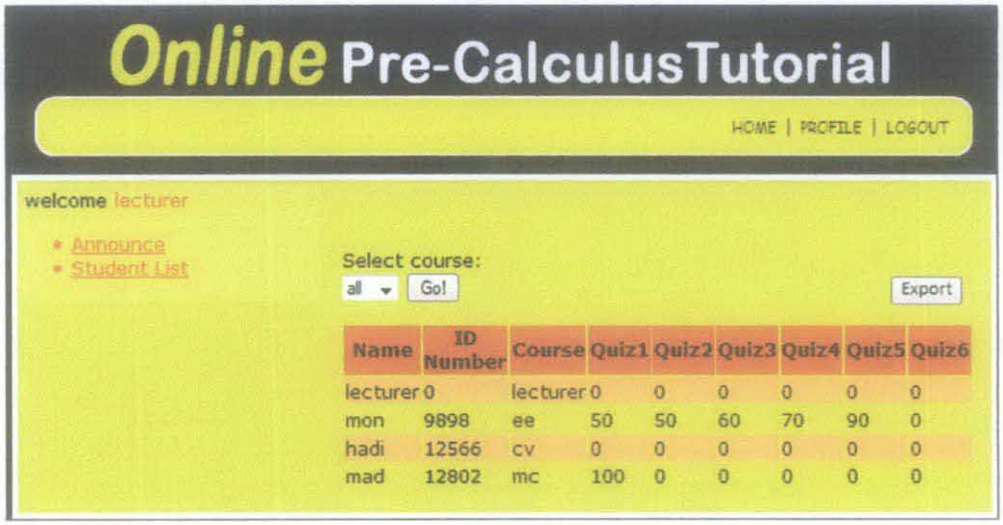

Figure 27: Database table

The database also can be export to the Microsoft excel. The "Export" button will make it happen by clicking to it. The lecturer then can save the student database in the personal computer and analyze it.

4.2.8.4 Online Assignment Submission

Assignment is one of the learning method practices by many instructors. The modern technology will enable the student to submit their work over the internet because this will save the time and energy. The technology evolved everyday and also the people way of doing thing.

This system offers the online assignment submission. The normal assignment submission may be done by the email but for a large number of students submit their assignment over the email, the email will stack and this will make it difficult for the instructor. This system reduce the instructor workload by organize the assignment submission. The student can send their assignment through their profile page, and the lecturer can download it in the student database. This will make the lecturer work easier to check for the late submission because the database will mark the student who doesn't submit the assignment.

Figure 28: Submit form

4.3 Initial Analysis

The early construction of the virtual tutorial is to create the layout of the virtual tutorial. The layouts consist of the entire interface and the content of the tutorial. The content will consist of the login part. This is where the student login to their account. After that is the construction of the database. All the student detail will be keep in the server database. Next is the tutorial part. The content of the pre-calculus course will be inserted in this part. Student that login to their account will learn about pre-calculus in this part. This part will have the animation to increase the student interest. Next is the construction of the quiz and test. In each chapter, there is quiz to assess student understanding. The mark will be recorded and their performance will be calculated. The lecturer will also have the account and can see the student performance in each quiz and test.

The system has been tested on students who are taking pre-calculus course. They were given the opportunity to use the system. They were given an account for each one of them. Using that account, they can login into the system. For the testing period, they can only access chapter one of the pre-calculus and after that, they take the quiz on the system. After they read the note on chapter one, they do the quiz that been made for them on the system. The analysis on the quiz and student performance is immediately appear after the student click the submit button on the quiz page.

Figure 29a and 29b shows the analysis on the quiz taken by one of the students. Figure 28a is the student with 0% mark while figure 29b is the student with 50% mark. When the student gets 0% for the quiz, the analysis will write:

- Your dont answer the question or all your answer is wrong
- Please do more revision on Inequilities
- Please do more revision on Algebraic Equation
- Please do more revision on Real Number
- Please do more revision on Exponential and Radical

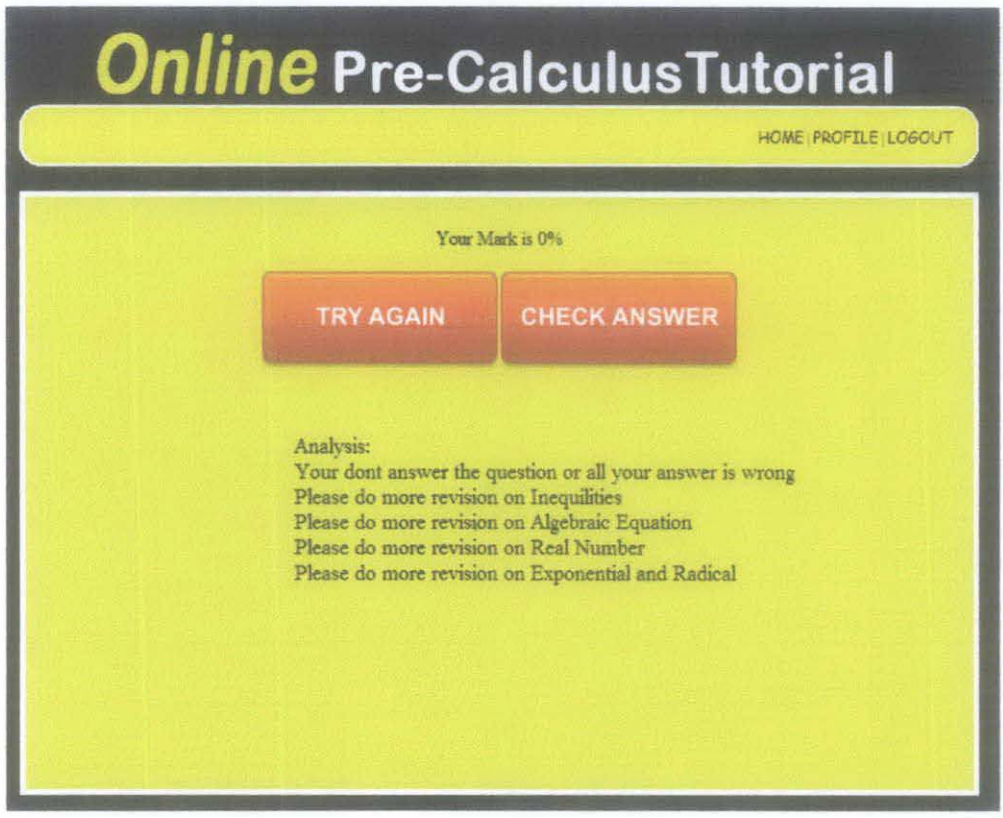

Figure 29a: Analysis on quiz with 0% mark

The student that gets 50% mark for the quiz, the comment on analysis also reduced. The only comment is for the wrong answer the student do in the quiz. If the question on real number the student get it wrong in the quiz, they will received the comment to do more revision on real number. So, the student will know on what chapter they need to emphasize more. If the students not satisfied with the mark, they can retake the quiz by press the button try again and if they click the check button answer, they will be given the answer to the quiz. After that, they will be given another set of quiz if they want to do the quiz on chapter one again.

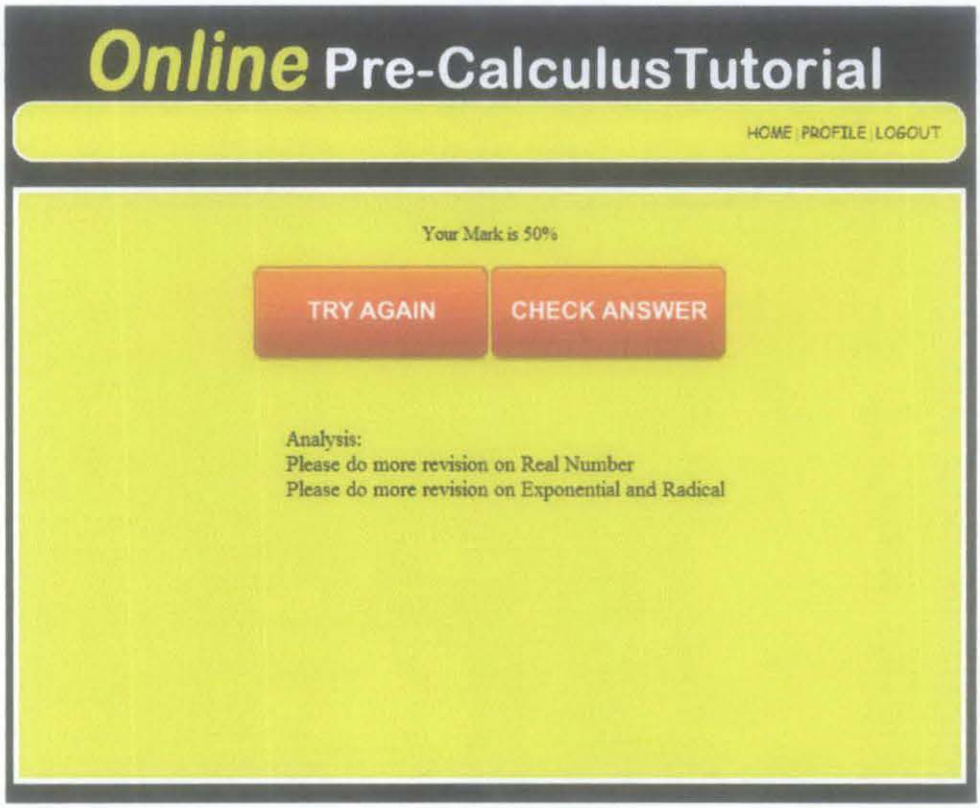

Figure 29b: Analysis on quiz with 50% mark

Furthermore, the students can check the performance on every quiz. The graph is generated after they done the quiz. This way, they can track on what chapter that they should do more revision.

Figure 30: Graph for quizzes

As for the lecturer, they can keep track of the student performance in the lecturer page. The list of student is generated with the information about their achievement in the quiz. The lecturer also can see the graph of student that get the mark above 50% and below 50%.

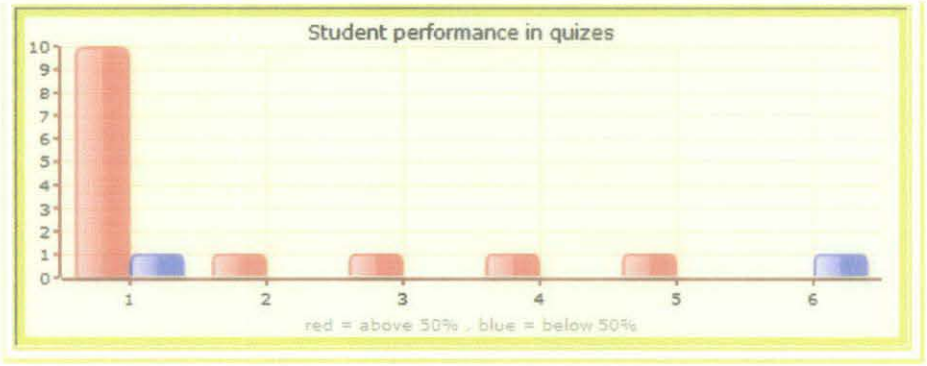

Figure 31: Graph for lecturer

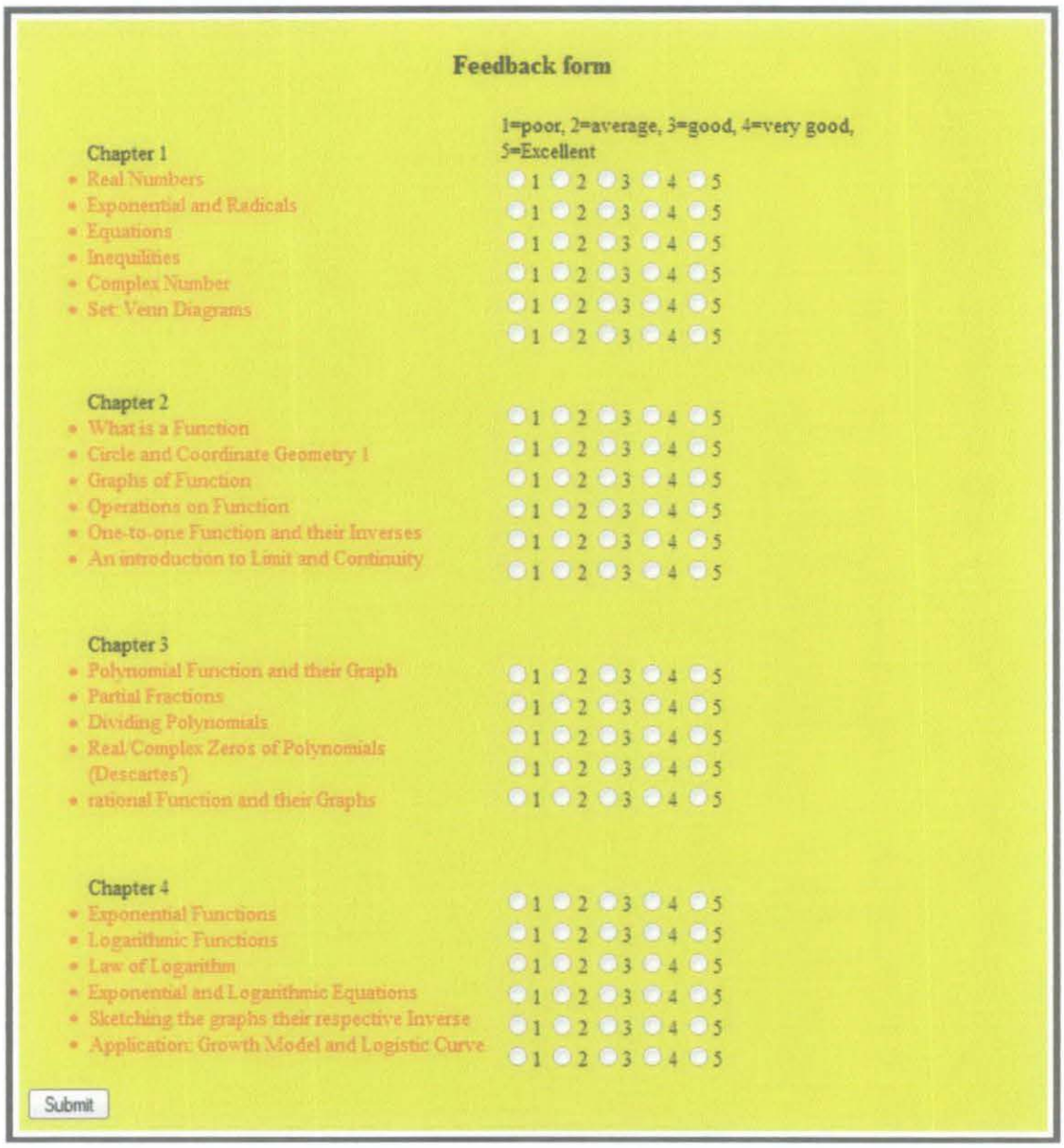

Figure 32: Feedback Form

Students will be given feedback form in the middle and end of semester. The students must fill up the feedback form about their understanding on each chapter. The rating is 1 to 5. If the students really understand about the chapter, they will pick number 5 and if the students don't understand anything about the chapter, they will pick number 1 and the average is in the middle. The rating point will be keep in the database and will be translate into the graph. The graph then will be presented in the lecturer page.

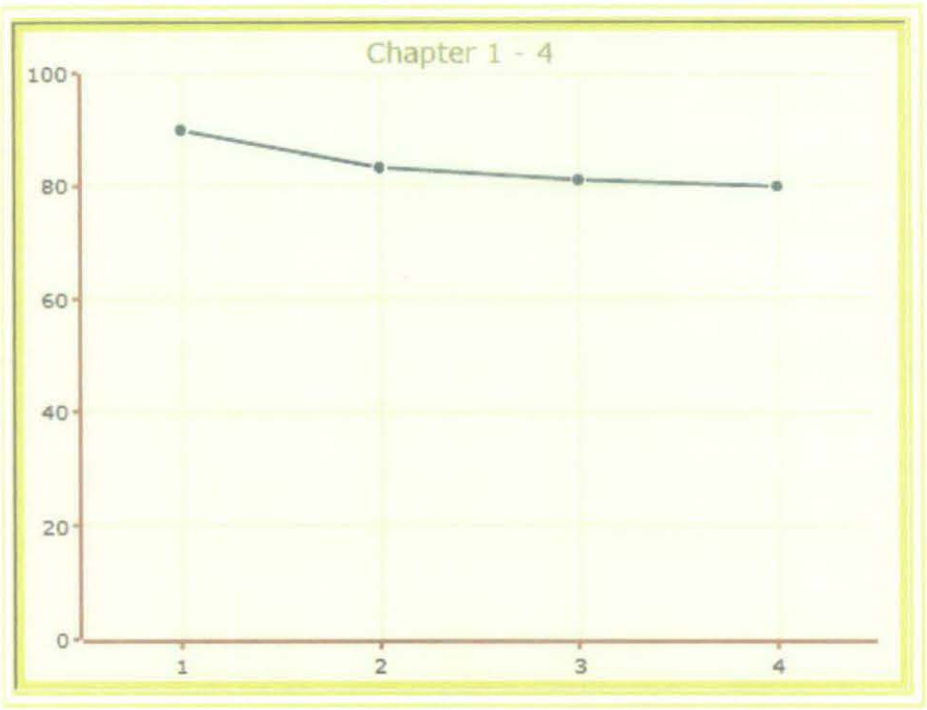

Figure 33: Feedback graph

The graph for the feedback is shown in the lecturer page. The lecturer can know the student weakness in each chapter by looking at the chart. The chart shows the percentage of the feedback rating from the student. The lower the student rating on the chapter, the lower the chart will be. So, the lecture can expect on what chapter need to be improvise and revise more. As can be seen in figure 33, the graph is decreasing as it goes from chapter 1 to chapter 4. The lecturer needs to take some action such as give more quiz or assignment of the particular chapter.

4.4 Discussion

Thirty five students who are taking the pre-calculus course have been instructed by the lecturer to use the system. Each of them is from seven different courses in UTP. So, each the courses have five students register in the system. For the first time, the system is being use by the students and the system work successfully. The students can access the note in the system and finally take the quiz in the system.

The results for the quiz are kept in the system database. Then, the result is being downloaded to the computer to be analyzed more. The student performance from the result of the quiz can be divided into three groups. Group C is the group with low performance which is anyone that get below 40, group B is the average performance which is from 41 to 79 and group A is the top performance which is 80 and above. So, these three types of group can be track and analysed.

Figure 35 shows the list of students that with the quiz result. The students take five quizzes and the average result is for each quiz is 67.7, 72, 73, 74, and 75.7. Figure 34 shows the number of student in each group. Most of the students in on group B, followed by group A and finally group C.

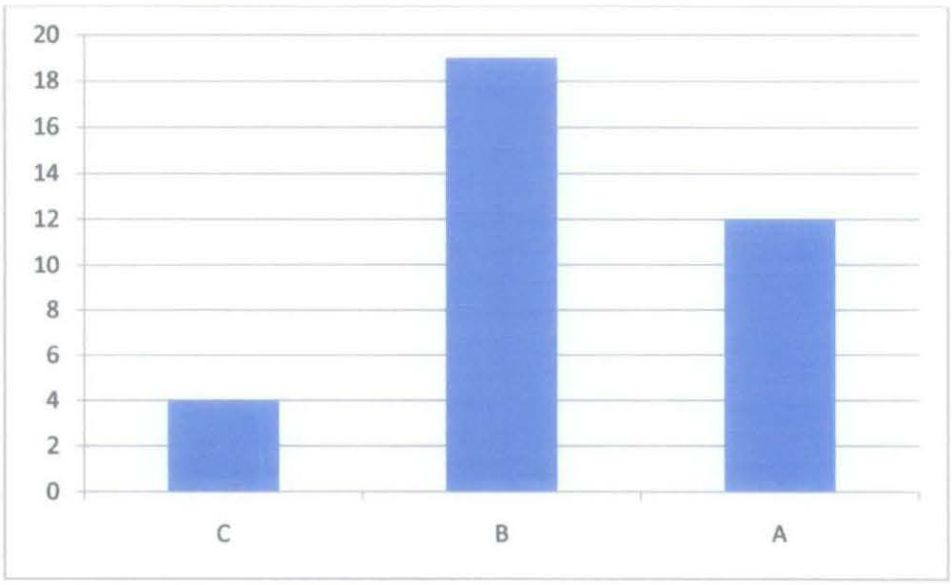

Figure 34: Number of student in each group

name	matrix	course	quiz1	quiz2	quiz3	quiz4	quiz5	
ATIKA ILLYANI BT ANAS	15029	bis	32	37	45	56	57	
ARUJENDRAN A/L M.K. GANESAN	15027	bis	40	48	53	56	46	
IZATUL NADIA BT ABU SAMAH	15038	bis	69	74	83	76	74	
MUHAMMAD UMAR RIJALUDDEEN HUSIN	15045	bis	70	78	84	77	72	
SHALINI A/P SUBRAMANIAM	15055	bis	75	85	78	76	77	
ADAM BIN AHMAD ZAKIYUDDIN	15049	cm	70	77	84	75	75	
MUHAMMAD ZULHAIRI IBRAHIM	15169	cm	70	87	84	75	77	
HERMAN AZHAR	15167	cm	80	75	74	87	85	
TEO YUAN WEN	15159	cm	83	79	87	85	96	
LE PHUONG	15084	cm	87	85	74	76	74	
wan kamal bin wan musa	15264	cv	40	46	62	57	65	
mohd hafizi bin mustafa	15102	cv	74	82	78	78	78	
wan amirul b wan mustafa	15124	cv	82	77	85	84	85	
hadi aiman bin hamidon	15166	cv	88	83	88	84	89	
mohd nadmin b ibrahim	15105	cv	89	83	73	75	83	
abu hassan bin samad	15032	ee	50	52	63	67	67	
mohd amin bin fakrul	15288	ee	56	68	74	75	64	
abdul hadi bin kamal	15043	ee	68	75	74	78	64	
shukri bin jamal	15250	ee	72	89	75	73	79	
muhd hassan b abdullah	15056	ee	90	84	74	76	85	
HARVIN KAUR A/P GURCHRAN SINGH	15150	ict	78	84	77	89	85	
SITI NOR IDAYU BT NGATENAH	15137	ict	80	82	78	78	84	
TEE PING HONG	15127	ict	82	78	85	85	95	
ROZANA BT RAHMAT	15120	ict	86	78	86	85	90	
INTAN PRATIWI	15162	ict	87	94	87	87	89	
mohd azwan bin hamidon	15275	mc	31	36	45	56	58	
MUHAMMAD ASLAM MD YUSOF	15025	mc	35	47	42	54	57	
mohd firdaus bin suid	15283	mc	50	52	64	67	68	
BIBI SYABILA BT NOR AZAHAR	15134	mc	70	75	85	76	78	
mohamad bin ahmad	15115	mc	76	84	74	78	84	
NOR AZREEN BT MOHD NOOR	15020	pe	30	35	44	45	59	
RICHARD ZHI CHENG, LIAW	15034	pe	50	64	65	75	67	
KHOO SHUK YEE	15195	pe	73	87	78	73	79	
TAN SHWU FEI	15106	pe	73	83	73	78	77	
BIANLALA SUSETYO	15160	pe	85	78	85	85	90	
mean			67.7429	72.02857	73.14286	74.2	75.77143	
standard deviation,σ			18.6111	16.69534	13.3794	10.79433	12.02225	
Confidence Level(95.0%)			6.02537	5.735051	4.595985	3.707983	4.129787	

Figure 35: List of students

Table 1 shows the comparison between the existing system with this virtual tutorial system.

Existing system	Virtual Tutorial Pre-Calculus
Cannot analyse student performance	Analyse student performance with graph
Don't have course feedback	Have course feedback online.
Cannot submit assignment online.	Provide online assignment submission.
Instructor hard to keep track on student	Instructor given a list of student with information and can download it.

Table 1: comparison between exiting system with this system

Above table shows the different between the existing table that been used by the students and this system. The system shows more advantages that the students can get. The system has system analyser that will display a result in graph. It also have online feedback which is a crucial thing in web based learning. As for the students, it provide online assignment submission and finally for the instructors, they can download the list of student with information to their personal computer.

4.5 The Advantages

The general benefits of Web-based learning when compared to traditional instructor-led training include all those shared by other types of technology-based training. These benefits are that the training is usually self-paced, highly interactive, results in increased retention rates, and has reduced costs associated with student travel to an instructor-led workshop. When compared to CD-ROM training, the benefits of Web-based learning stem from the fact that access to the content is easy and requires no distribution of physical materials. This means that Web-based learning yields additional benefits, among them:

1. Access is available anytime, anywhere, around the globe. Students always have access to a potentially huge library of training and information whether they are working from home, in the office, or from a hotel room. As cellular modems become more popular, students will even be able to access training in a place that doesn't have a traditional phone line or network connection.
2. Per-student equipment costs are affordable. Almost any computer today equipped with a modem and free browser software can access the Internet or a private Intranet. The cost of setup is relatively low.
3. Student tracking is made easy. Because students complete their training while they are connected to the network, it is easy to implement powerful student-tracking systems. Unlike with CD-ROMs that require students to print reports or save scores to disk, Web-based learning enables the data to be automatically tracked on the server-computer. This information can be as simple as who has accessed the courseware and what are their assessment scores, to detailed information including how they answered individual test questions and how much time they spent in each module.
4. Possible "learning object" architecture supports on demand, personalized learning. With CD-ROM training, students have access only to the information that can be held by one CD-ROM. The instructional design for this type of delivery, therefore, has been to create entire modules and distinct lessons. But with Web-based learning, there is virtually no storage limitation and content can

be held on one or more servers. The best Web-based learning is designed so that content is "chunked" into discrete knowledge objects to provide greater flexibility. Students can access these objects through pre-defined learning paths, use skill assessments to generate personal study plans, or employ search engines to find exact topics.

5. Content is easily updated. This is perhaps the single biggest benefit to Web-based learning. In today's fast-paced business environment, training programs frequently change. With CD-ROM and other forms of training, the media must be reduplicated and distributed again to all the students. With Web-based learning it is a simple matter of copying the updated files from a local developer's computer onto the server-computer. The next time students connect to the Web page for training, they will automatically have the latest version.

There are only two real disadvantages to Web-based learning, and both will be overcome in the next five to ten years as high bandwidth network connections become as common as telephones. The first drawback, when compared to live instruction, is the lack of human contact, which greatly impacts learning. Web-based learning is better than CD-ROM learning in this regard. Students can use their Web connection to e-mail other students, post comments on message boards, or use chat rooms and videoconference links to communicate live. While this type of interaction is helpful, and an improvement over CD-ROM learning, it still doesn't have the impact of a live workshop. With higher speed connections and improved conferencing software, one day students around the world will be able to communicate in real time with each other through full-screen video.

The second major drawback is the lack of multimedia in many Web-based learning programs. The use of audio and video are critical to creating compelling metaphors, realistic job simulations, and accommodating different learning styles. Full multimedia delivered over corporate Intranets is possible, and many companies are doing it. But in most cases, even if students have a high-bandwidth Intranet connection, corporate information technology departments don't want large media files used because it slows

down the entire network. The result is that most Web-based learning programs are still comprised of text and graphics alone. Once again, the bandwidth problem will be solved in the near future with advancements in network protocol standards and software compression. Using Web-based training, like all other delivery media, has advantages and disadvantages. Trainers and designer must carefully weigh these against the profiles of other options on a case-by-case basis.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 Conclusion

This project explains how the online virtual tutorial has been build from scratch. This tutorial will give the student way to learn outside the classroom. As for the lecturer, the tutorial will reduce the lecturer work on student analysis. Web-Based Learning (WBL) offers many advantages over traditional instructional formats, but also entails many disadvantages. Like blackboards and slides, WBL is a powerful tool but only a tool, which if used wisely can greatly facilitate learning. This project hopefully will give the satisfaction and convenient feeling for the entire user of the system.

5.2 Recommendation

As any research, there is still room for improvement in the research and to have better finding from it. There are many other factor may also need to be considered in future research such as type of students and language used in learning mathematics. We aware that there are some limitations in our experiment design. A longer study period and larger sample size are needed to be observe the long term effect of the educational system. this would be a great challenge to the research because larger commitment from all parties is required.

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APPENDIX

Activities / Week	1	2	3	4	5	6	Mid-semester break	7	8	9	10	11	12	13	14	15
Topic selection																
Research of Project Title																
Submission of Preliminary Report																
Study on existence project																
Study on materials needed and how its work																
Preparation for Progress Report																
Submission of Progress Report																
Check system availability and suitability																
Seminar																
Submission of Draft Report																
Continue to build the system																
Study for improvement																
Ready with knowledge to setup and program system																
Submission of Interim Report																
Preparation for Oral presentation																
Oral presentation																

Table 1: Gantt chart for FYP 1

Study and research

No.	Detail/ Week	1	2	3	4	5	6	7		8	9	10	11	12	13	14
1	Project Work Continue															
2	Submission of Progress Report															
3	Project work continue															
4	Poster Exhibition															
5	Submission of Dissertation (soft bound)															
6	Oral Presentation															
7	Submission of Project Dissertation (Hard Bound)															

Table 2: Gantt chart for FYP 2

Process